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The Sanitary News.

HEALTHY HOMES AND HEALTHY LIVING.

BOSTON MEDICAL LIBRARY ASSOCIATION

A SEMI-MONTHLY

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G. P. BROWN, EDITOR.

JNO. K. ALLEN, ASSOCIATE EDITOR.

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The Sanitary News.

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Current Topics.

No plumber can obtain a license in Chicago unless his application is signed by two licensed plumbers and he afterward gives a bond satisfactory to the city authorities. Unfortunately, these apparent precautions have not always prevented incompetent plumbers—and, indeed, men who were not plumbers at all,—from getting licenses. It was discovered recently that a painter, employed by a house contractor, had been licensed to do plumbing, and he was actually engaged in plumbing a row of houses on the West side. Inquiry developed the fact that his petition and bond had been signed by two regularly-licensed plumbers. Such an outrage is not likely to be repeated, as the city authorities have agreed to send all applicants to the license committee of the master plumbers' association, who will subject them to an examination to discover their qualifications. It is a promising sign for the future of plumbing in this city that something has been done to correct the evil of an indiscriminate licensing of all applicants, and it is desirable that no licenses shall be issued for the coming year to any but reputable and capable plumbers.

Mr. E. W. Blatchford, of this city, has been appointed a member of the government commission to inquire into the foreign objections to the American hog.

The supreme court of California has recently made a decision in a case contested by two water companies, one of which removed the water of Santa Anna river by ditches, to the detriment of the other company farther down the river. The court decided that the company had no acquired right to divert the stream from their neighbors below. This is an important decision for water engineers to remember.

Cremation will receive a powerful impetus from Portugal if the cable dispatches are correct. It is reported that it has been decreed that, in all the municipalities, the cemeteries shall be emptied each five years, and the bodies be publicly cremated. Why the law is to wait five years, which is quite enough time for contaminating the earth and the water-supply, instead of having the bodies cremated at once after death, is not clear. It may be a conciliation to the sentiment of the people.

The chapter of the American institute of architects of San Francisco maintains classes in practical architecture, free-hand drawing, and modeling, and will establish classes in mathematics and carving.

For years the character of meat sold in the markets of Chicago has not been above suspicion. Chicago canned beef has also been the subject of a well-founded distrust on the part of consumers. This suspicion and distrust arose from the fact that animals known to be suffering with disease, such as hog cholera, cancer and splenic fever in cows, and foot-rot in sheep, were shipped to the stock-yards in this city, and slaughtered either by unscrupulous local dealers or packers. There was great profit in the practice. This rascally trade is to be broken up. For some time the health department have had one inspector located at the stock-yards. Since September 1, he has condemned and sent to rendering-establishments, eighty-five head of cattle. At the present time, two inspectors are located there, and their inspection is severe. This inspection will undoubtedly be maintained, and there need be no further fear of the quality of meat offered for sale in Chicago. In connection with the inspection of cattle, it may be said that this inspection benefits other cities as well as Chicago. Inspector Lamb notified the Chicago health commissioners last month that three carloads of cattle, containing twenty head affected with cancer, had been sent to a firm in Grand Rapids, Michigan. Notice of their approach was immediately sent to the health authorities there. It might be said, in passing, that Grand Rapids is not a good place in which to dispose of diseased meat, the health authorities being uncommonly watchful and successful in the prosecution of guilty parties.

Dr. Brockholst McVickar, who was the first health commissioner of Chicago, died last month.

Australia has a health society at Melbourne, which, patterned after English organizations, attempts to improve the sanitary condition of the poorer people, by distributing tracts in which sanitary knowledge is contained in short stories. This method of reaching the people has never been tried in the United States. In fact, our health boards and organizations have confined their efforts almost entirely to the prevention of the contraction of contagious diseases. The Sanitary News would like to see circulated a story-tract on "Soap and Water," such as has been received from the Australian health society, in which a Mrs. McGuire is, through attendance at a lecture and a quarrel with a neighbor, brought to see the desirability of maintaining a cleanly household. As an experiment it might be tried. Its practical result would probably be to pave the way for the reception of, and obedience to, the "rules for the prevention and restriction of contagious diseases."

Dr. R. B. S. Hargis, of Pensacola, and Dr. J. D. Bullock, of Palatka, have been commissioned by Governor Bloxham, of Florida, to represent that state at the meeting of the American public health association in Detroit this month.

The history of the American public health association well illustrates the growth of sanitary science in the United States. The association was organized in 1872, largely through the efforts of Dr. Stephen Smith, of New York, having, at its organization, scarcely forty members. It has had enrolled during the ten years of its existence over seven hundred members, and there are probably five hundred members now. The influence which this body of representative men has exerted toward improving the sanitary condition of our people has been very wholesome.

The cosmopolitan character of our population is a great barrier to sanitary progress. Were we all of one speech, as in England, the problem of improving the conditions of life would be very much simplified. As it is, the only way to attack foreign indifference and the filth usually attendant upon the poverty of our foreign-born population, is to print health rules in their own languages, and scatter them broadcast among the people who can read them. Several of our state boards of health have already printed several documents in the German and Holland languages, but the Michigan board has begun to be more aggressive than the rest, and proposes to have rules for the restriction and prevention of contagious diseases printed in the Scandinavian, French, and Polish languages. If the documents are freely distributed after they are printed, the object will be accomplished. It would be a good thing for the state boards of health to employ colporteurs to distribute their health tracts.

The Indiana state board of health has made what its secretary calls a beginning of a series of efforts practically to demonstrate the great value of the work of the board. This effort consists in the sending out of a circular addressed to the health officers of the counties, cities and towns, asking them to make a complete report upon the sanitary condition of each school-house in their jurisdiction. The circular is accompanied by a blank form, on which the health officer is requested to make his sanitary survey, and on which are printed twenty-three questions concerning school conditions. These questions are eminently practical and the replies to them, when compiled, should form a valuable chapter in school hygiene. After asking questions touching the location, size, and condition of the house and of its surroundings, the blank takes up ventilation, heating, and lighting, the position of blackboards as regards windows, the source and purity of the water-supply, the condition of the privies, the requirements as to vaccination and infectious diseases, and closes by asking whether the students are overworked, and whether the doors all swing outward, as the law requires. The blank omits one question which has a marked connection with disease, especially of the urinary organs, namely, the length of sessions.

The state board of health labors under a mistaken idea that health officers will make these sanitary surveys "without additional compensation" to that already received, which in the great majority of cases, is probably nothing. It has proved to be a great barrier to municipal sanitary work,—asking health officers of the townships, villages, and smaller cities, to do all their work without cost, because they are "liberal-spirited" physicians. A report of the character of the sanitary survey of a school-house under consideration, the results of which are expected to be valuable and reliable, should not be asked without pay. If it is so expected, the report either will not be made at all, or it will be made by guess. To make correct replies to the questions will require a personal inspection of the school-house, and as much labor besides as the physician puts forth in examining a candidate for life insurance, for which a good company pays ten dollars. If the local board of health will pay a fair price for the work they expect of their health officers, they will secure work worth the money, and there will be a large increase in the ranks of sanitarians.

Governor Butler has decided, upon opinion furnished by the state attorney general, that the word "persons" in the Massachusetts law organizing the state board of health, lunacy and charity does not include women. He has accordingly held that Mrs. Leonard was illegally appointed a member of the board, and has appointed a gentleman to fill the alleged vacancy. Ever since a mistaken idea of retrenchment and reform led the legislature of Massachusetts to consolidate the three boards now known by the incongruous title of the present board, there has been more or less trouble. The several boards, previous to their consolidation, were well known for the good work which they accomplished. But since they were made one, there has been little work and a great deal of quarreling, especially with Governor Butler. The merits of the altercation between Messrs. Butler and Talbot, the latter a member of the board, are matters of political preference, but, to outsiders, it seems to be a petty show of political demagogism.

At the Huddersfield meeting of the English national association for the promotion of social science, last month, the following questions were considered in the health department: (1) Is the modern system of education exerting any deleterious influence upon the health of the country? 2 Is it desirable to take any, and what further, measures to prevent the spread of zymotic diseases through the milk-supply of our towns? (3) Is it desirable to extend or amend the habitual drunkard's act, and, if so, in what direction? The department is under the direction of T. Pridgin Teale.

In a forcible editorial, *The San Francisco Post* states that typhoid fever and diphtheria are fatally prevalent and increasing, and that the city is in an unhealthy state, with the liability of an outbreak of an epidemic disease at any moment At the same time they are threatened with an importation of yellow fever from Mexican cities lower down the coast. Quarantine by sea has been established, but inland travel is unrestricted. *The Post* says: "Under these conditions favoring epidemic disease, the south wind carries the stench of putrid Butchertown over the low-lying parts of the city, and the north winds, which blow for some hours daily at this season, spread the inexpressible stink of the Powell street pond of death over the north end. The numerous funerals from that quarter attest its fatal policy. Yet noth-

ing has been done to continue the Powell street sewer to the sea-wall, and drain the putrid mass of filth which has accumulated in the inclosed space. Promises to do so have been made indefinitely, but none have been kept. When the city is sued for damages, as it may be, on account of deaths caused by the culpable negligence of its officials, in permitting the continuance of fatal nuisances, north and south, the taxpayers will awake to the necessity for immediate and effective action."

The difficulty pointed out in San Francisco is one of the greatest obstacles to municipal sanitary advancement in other cities. It lies in the fact that the interests of large corporations are more vital to the municipal council than the well-being of the citizens. The nuisance caused by a lard-rendering establishment, for instance, is not abated because the proprietors will pay more to city councils to be let alone, than they will for proper means to abate the nuisance. This applies to San Francisco, as regards the extension of the Powell street sewer. As it is now the outfall of this sewer is between the shore and the sea-wall, which will not permit the sewage to pass away with the tide. The opposition to the extension of the sewer comes entirely from a corporation, which seems to have the power of commanding the authorities. The remedy for this condition is a thoroughly-posted, and energetic health officer, who will do his duty even if he does incur enmity.

The commissioner of agriculture, Mr. George B. Loring, has issued a very important circular, in which he has called, at Chicago, on November 15 and 16, a conference of representatives of all bodies interested in the animal industries of the United States. At this convention it is proposed to discuss the subject of contagious diseases among our domestic animals, under the following heads: (1) The extent to which they prevail in this country; (2) the methods of their introduction and spread; (3) the methods by which they may be eradicated or isolated; (4) the efficiency of existing legislation. The convention is called to meet during the progress of the annual fat-stock show, and other live-stock meetings, hence it is probable that there will be many stock men present. The commissioner should not forget to send invitations to state boards of health, many of whom are actively interested in the subject.

Small-pox in New Orleans is as dangerous to the local prosperity as it is to northern health. At a recent meeting of the auxiliary sanitary association of that city, the following plan was adopted for the eradication of small-pox: The employment of fifteen physicians and ten sanitary policemen, who should make a complete sanitary survey of the city, embracing the following points: The number of males, females, adults and children vaccinated, unvaccinated, and who have had small-pox, as regards both the white and colored population; to offer free vaccination at every house; to keep a list of all vaccinations, revaccinations, and residences and occupations of those who refuse vaccination. In addition to the sanitary survey, every house in which small-pox has existed during the present year shall be visited by a sanitary officer, who shall inquire as to the number of cases, their termination, the manner of disinfection, and whether cases occurred after disinfection. Depots for gratuitous vaccination will be established. If the vaccinations are properly performed, with active virus, the best of results should follow this inspection. The local press can aid the association, by popularizing vaccination as a disease-preventing agent. In the meeting at which the above scheme was adopted, Dr. George J. Friedrichs is reported to have made the statement that he believed small-pox would exist independent of any measure that could be taken to eradicate it, and that fumigation did not destroy the germs of the disease. If the doctor possesses facts with which to prove his statement, it would be well to make them public. It would be difficult to say with positive assurance, just how small-pox is communicated, and whether the theoretical vehicle had been actually brought under the influence of the disinfectant.

The *American Architect* states in a recent number that "no system of ventilation hitherto devised can take the place of open windows." The statement, if taken as it reads, is not defensible, for any system of ventilation can take the place of open windows. But, taken as the writer evidently means, it is still a question whether he is correct. In the summer, there is no system which is intended to take the place of open windows. Nor is it desirable to attempt to substitute, at an expense, what nature supplies freely. In winter, however, when it is not practicable to have open windows, some system should be introduced which will act more agreeably than the open-window system. Theoretically, a supply of fresh air warmed to a summer temperature, introduced at the floor level in sufficient quantity to maintain its purity, the exit to be made through an opening at the floor level into a heated flue extending through and above the roof without other opening save at its top, would equal the summer, open-window system of ventilation. Such ventilation is quite common in the west, and very successful.

Rye Beach, with its visitation of sickness caused by contaminated water, is soon followed by continued fever at Asbury Park and Ocean Grove, N. J., where sickness occurred in houses whose owners refused to connect with sewers. The health authorities had condemned the places as nuisances. In two cases, where driven wells were used, the water became saltish, due to the salt water thrown upon the ground in the next lot from ice-cream booths.

Reform is always, and perhaps necessarily, accompanied by what seems to be an extreme apathy on the part of the general public. This may be a mental delusion, caused by the quickened perception of reformers, for progress is certainly being made in all lines. In the report of the committee on hygiene and public health, before the medical society of Virginia, Dr. W. F. Barr states that nothing had been reported during the past year that was entitled to be termed an advance. His statement is true, possibly, as regards Virginia. That state was one of the first in this country to establish a state board of health, which had a precarious existence of a few years' duration, when it had to go out of commission for lack of appreciation and accompanying funds. There have been efforts to have it resuscitated at each session of the legislature without success. Hence to the Virginian the future of sanitary progress may look dark and unpromising, but the view which may be had from other portions of our country is most inviting.

CHICAGO SEWERAGE—RESULTS, COST, ETC.—XIV.

There is no doubt that the canal pumping-works have been of great service, not only in purifying the river, but in lessening the danger of contamination of the city's water-supply. The great obstacle to their complete efficiency is the lack of capacity in the canal. The banks are so low in places that the water overflows at times, or the bridges are so low that boats cannot pass under them. This is not due altogether to the excessive pumping, but to the fact that the water of the Des Plaines river, which flows parallel with and along the side of the canal, is allowed to discharge its waters freely into the canal. Invariably after heavy rains, or in the spring when the snow is melting, the Des Plaines rises from one to ten feet and overflows the surrounding country. The water is helped on its way to the canal by a ditch, originally constructed to supply the canal, near its head, when water was low in the Chicago river. This ditch was properly dammed once, but the dam is now half broken down and almost of no use. There has been more or less quarreling about that dam, between the city authorities and the canal commissioners, but it continues to fall to pieces. When the pumps are not in operation the excessive flow of water finds an outlet through the Chicago river, and it is at such times that the river is thoroughly cleansed of its sewage; but this sewage is swept out into the lake with such force that it is carried directly to the water-works crib, and the water is rendered unfit for use. The city, with remarkable shortsightedness, is satisfied, if not pleased, as the river is cleaned, dredging becomes unnecessary and the expense of running the pumping-works is saved. With the water of the Des Plaines running into the canal the pumping has to be stopped, both because the canal cannot receive additional water, and because it would immediately return to the Chicago river. The Des Plaines shut off absolutely from the canal, the latter could be, at all times, sufficiently supplied with water, either by the natural flow of the Chicago river when the lake was high, or by the pumping-works, when the current would naturally be toward the lake. If the Fullerton avenue conduit were always used to discharge water into the North branch, and the canal pumping-works always kept at work,—the Des Plaines being required to take care of its own floods,—the sewage of Chicago would be properly disposed of for the present.

This can hardly be considered a final solution of the question, even if the small canal should, in the future, be enlarged to a ship canal. However great the amount of water which might be used to dilute the sewage, the latter would still contaminate it, and it would continue to be a nuisance, if not a source of danger. With the sewage of a great city like Chicago emptying into the Illinois river and thence into the Mississippi, cities situated along the banks of these rivers cannot safely derive their water-supply from them. This is plainly shown by the experience of the city of Peoria, a city of twenty thousand inhabitants, on the Illinois river nearly two hundred miles from Chicago. Water-works were built a few years ago, the supply being obtained from the river some distance above the city. The water is so seriously contaminated by Chicago sewage that it is very offensive. The well-to-do citizens refuse to use it in their houses except for washing purposes; they have laid a system of pipes connecting with springs and artesian wells. The poor people are compelled to use it for culinary purposes and the effects are plainly shown on their health. If there is any virtue in dilution it ought to be indicated in this case, as the Illinois river is of considerable size, its own waters being augmented, before reaching Peoria, by several large streams.

The extreme western and southwestern portions of the city of Chicago are drained by sewers emptying into the only intercepting sewer in the city,—on Twenty-second street, extending west from Leavitt street to the city limits. It is nine feet in diameter at Leavitt street, but is reduced in size to six feet at the limits. An outlet for this sewer is now being constructed at Leavitt street to the river a few blocks south. The present small sewers in that vicinity emptying into the river will be used as storm overflows. This provides for the drainage of that part of the city, at the southwest corner, known as Lawndale. The grades of brick sewers in the city range from four-hundredths of a foot per hundred feet for sewers from four to ten feet in diameter; five-hundredths of a foot for a three-and-a-half-foot sewer; six-hundredths, for a three foot sewer, to ten-hundredths, for sewers two to two and a half feet in diameter. The grade for pipe sewers varies from fifteen-hundredths of a foot for a twenty-inch pipe to two feet for one six inches in diameter, for every one hundred feet. The cuts for sewers, in laying them, are almost uniform, the deepest being in the northwestern part of the city; the Lincoln avenue sewer, between Center street and Webster avenue, lies 14.2 feet below the surface. The lowest part of the city is in the vicinity of Throop and Thirteenth streets; in one street the cut was three feet. The average cut is about seven feet.

Brick sewers that are from two to two and one-half feet in diameter have only one ring; two rings are used on those from three to six feet in diameter; three rings, when from six and one-half to nine, and four rings for those larger.

The following table shows the number of feet of sewers laid for each year since the inception of the work, the number of catch-basins and man-holes constructed, the number of private drains laid, the cost of cleaning the sewers and catch-basins and the total cost of constructing the sewers.

Date. Prior to	No. of feet of Sewers laid.	No of Catch-Basins con-struct'd	No. of Man-Holes con-struct'd	No. of Priv'te Drains laid.	Cost of Cleaning Sewers and Catch-basins	Total Cost of constructing Sewers.
May 6, 1861 ---	283,586	1,214	2,102	2,194	$16,494.21	$665,188.46
Jan. 1, 1862 ---	2,826	18	33	243	1,715.50	3,617.31
April 1, 1863 ---	15,676	72	66	365	4,897.24	57,264.51
April 1, 1864 ---	39,605	191	204	536	5,055.40	169,290.29
April 1, 1865 ---	25,021	189	183	512	9,364.68	87,221.48
April 1, 1866 ---	29,948	223	168	1,288	13,818.07	137,643.02
April 1, 1867 ---	48,127	527	271	3,722	28,445,16	225,564.53
April 1, 1868 ---	89,661	418	555	3,703	26,541.81	416,730,51
April 1, 1869 --	47,841	480	293	3,261	26,954.06	197,152.92
April 1, 1870 ---	137,705	771	928	3,979	26,015.18	654,141.26
April 1, 1871 ---	78,166	626	468	5,187	21,464.30	258,664.70
April 1, 1872 -	50,716	277	300	1,251	17,415.46	153,295.36
April 1, 1873 ---	47,342	245	341	1,435	21,484.16	173,255.76
April 1, 1874 ---	146,702	897	1,015	4,691	31,329.27	506,283.44
April 1, 1875 ---	222,322	1,054	1,474	6,292	36,929.57	531,446.83
Dec. 31, 1875 --	120,971	958	789	3,365	32,048.23	342,932.89
Dec. 31, 1876	15,248	155	75	1,172	29,345.41	79,545.28
Dec. 31, 1877 --	64,666	363	431	1,822	35,729.33	129,081.40
Dec. 31, 1878 --	88,031	492	603	1,544	25,704.37	160,453.75
Dec. 31, 1879 --	145,381	820	1,043	2,953	29,283.67	264,227.47
Dec. 31, 1880 --	79,128	271	554	3,038	25,561.48	229,727.61
Dec. 31, 1881 --	132,076	548	917	2,732	29,995.25	303,287.19
Dec. 31, 1882 --	98,515	792	453	3.581	33,969.35	197,788.79
Totals -------	2,011,280	11,372	13,323	58,866	529,611.16	6,011,698.44

THE AMERICAN PUBLIC HEALTH ASSOCIATION.

In the issue of THE SANITARY NEWS for August 15, attention was called to the meeting of the above association in Detroit from the 13th to the 16th of this month, and the recommendation was made that the association be made what its name indicates, an American association, and that this be accomplished by inviting membership from the Canadian provinces. It was thought that the coming meeting would be a most opportune time thus to secure Canadian members, because of the close proximity of Detroit to the provinces. Since the editorial referred to was written, there has been organized a Canadian sanitary association, which is dominion in its character. If it attains a vigorous and independent existence, it promises to become for Canada what our association is for America. The organization of this new sanitary society raises the question as to the advisability of merging the two societies into one continental association. Another suggestion, and one attended with less difficulty in its consummation, is to make arrangements with the Canadian association, by which an international organization should be effected, meetings to occur each two or three years, the international association not to interfere with, but rather supplement, the work of the two national associations. It is hoped that this subject will be considered at the meeting in Detroit.

The editorial suggesting the enlargement of the American public health association attracted the attention of many members of the association and called forth numerous opinions which were contained in letters to the editor, and which are, in substance, given below.

Dr. Ezra M. Hunt, president of the association, wrote :

We have the most cordial relations with all Canada boards and I have sent them invitations to be present at the meeting at Detroit.

Dr. Azel Ames, Jr., secretary of the association wrote that he could see no reason why opposition should be made to the admission of Canadian members.

Dr. J. Berrien Lindsley, treasurer of the association, wrote :

Your suggestion about the dominion is capital and ought to be carried out.

Dr. Charles Ambrook, member of the advisory council for Colorado, wrote :

Should Canadian sanitarians desire membership, I would cordially receive them. * * * It is certainly desirable to unite, at least, the English-speaking people of this continent into one organization.

Dr. J. W. Compton, member of the advisory council for Indiana, wrote :

I most heartily endorse your views in regard to the importance of making this association what its name imports, and that in the broadest sense, an American association. So large a proportion of the epidemic diseases which invade our states, especially cholera and small-pox, find their way to us by the great lines of commerce and travel through the provinces of Canada, that a social and professional intercourse with the most experienced sanitarians of that country, in the capacity of members, or invited participants in the deliberations of this association, would promise to do much toward perfecting means for preventing the transportation of diseases to our midst. This would be also a step toward effective organization of an international league, by which additional safeguards might be inaugurated, to prevent the importation of disease germs to this country, through the various channels of commerce. There is no way in which prevention can be employed so profitably as preventing germs of disease being brought to our country, for once here they will find abundant nests for their rapid propagation.

Dr. S. S. Herrick, member of the advisory council for Louisiana, wrote :

I have read with interest your article in the issue of Aug. 15, advocating the admission of Canadian members to the American public health association, and see no good reason why sanitarians from the British provinces of America should not be welcomed in this body as well as in the association for the advancement of science. It seems to me that the approaching Detroit meeting will afford a favorable opportunity for bringing up the matter, as it will take place within sight of the territory of our Canadian neighbors.

Dr. George H. Rohé, member of the advisory council for Maryland, wrote :

My individual opinion is that the active membership of the American public health association should be limited, as at present, to such persons as have shown a real interest in public health matters, either by original work or by teaching through the press, or from the platform. It seems to me that the distinction between active and associate members should be maintained. I quite agree with the editorial in THE SANITARY NEWS, that sanitary workers from Canada should be admitted to active membership. The cause in which the association is working could only gain by such an extension of its influence. With the proviso above stated, and with which I am sure your own views must coincide, I cordially approve of the proposition contained in your editorial.

Dr. Henry B. Baker, member of the advisory council for Michigan, wrote :

I cordially approve of the proposition to endeavor to enlarge the membership of the American public health association, so as to include members from the Canadian provinces.

Dr. D. W. Hand, member of the advisory council for Minnesota, wrote :

I think the plan a good one. The association would be benefited by the infusion of some new blood ; and there are many scientific men over the border we should be glad to greet.

Dr. Thomas F. Wood, member of the advisory council for North Carolina, wrote :

I think that your suggestion is a good one,—to admit members from the Canadian provinces.

Dr. J. T. Reeve, member of the advisory council for Wisconsin, wrote that the most cordial co-operation was desirable, but he was not sure but that two organizations would have more influence than a larger and more unwieldy body. He suggested that co-operation might be had by the free interchange of delegates.

Dr. Adrian Hudson, member of the advisory council for the United States navy, wrote :

I am very decidedly in favor of the enlargement of the association, which you propose. There has been recently a decided growth in the interest of our Canadian brethren in the direction of sanitary matters, and some very good work has already been accomplished. Surely it should be our policy to strengthen our hands in every way, and avail ourselves of all possible assistance in promoting the common good. An international, or continental, organization, such as you speak of, could not fail to be of immensely increased value in power and efficiency.

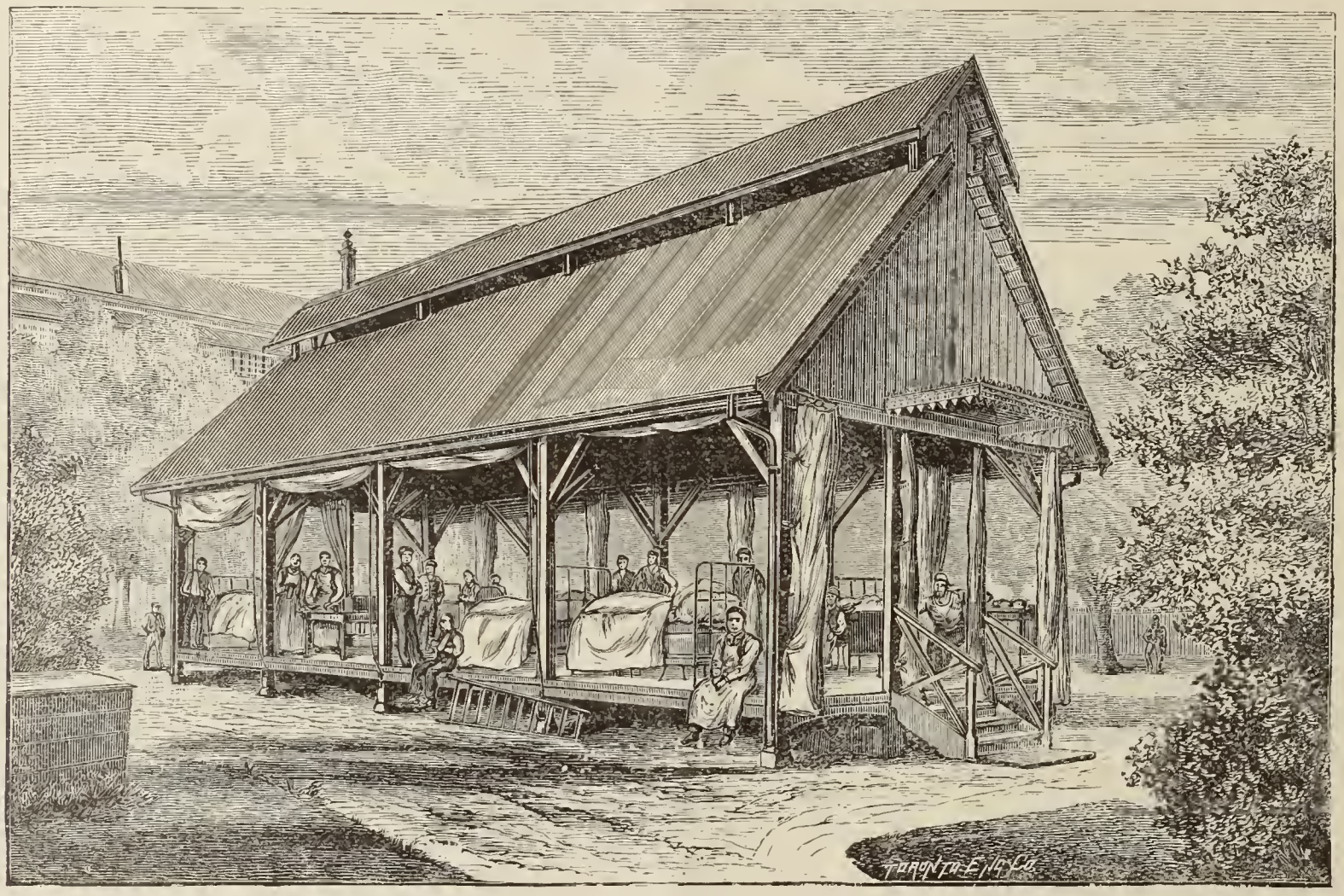
Dr. R. B. S. Hargis, of Pensacola, Fla., wrote :

"I have read the editorial article in THE SANITARY NEWS attentively and with delight, and am pleased to say that I fully concur with you in the opinion that our noble American public health association should as its name imparts, be literally and essentially American, embracing the entire continent from Behring strait to the isthumus of Panama ; for indeed, in sanitary matters of this great continent of America there is a community of interests existing, though not evolved, which suggests at once the necessity for co-operative international action."

THE SANITARY NEWS takes pleasure in presenting these views of representative sanitarians, and members of the association, and trusts that whatever course may be the outgrowth of this discussion, that it will result in great good to the association.

HOSPITAL FOR CONTAGIOUS DISEASES.

The proper form for a hospital for the treatment of the sick is as yet a matter of opinion which varies with the ideas of different persons. There are many stone and brick monuments to man's humanity to man, which exceed in kindness their practical usefulness. Most hospitals in cities are built many stories high to secure room which could not be obtained on one floor, on account of the high price of land. Notwithstanding the custom of building large hospitals, there seems to be a growing demand among hospital attendants for pavilion hospitals, so constructed as to be readily ventilated and lighted without resort to artificial methods. This demand sprung, in the first instance, from the experience of army surgeons in the rebellion, who had much better success in treating men in tent hospitals than in close buildings. For communicable diseases it seems best to use lightly constructed and inexpensive hospitals, which, if necessary, can be destroyed by fire after use in an epidemic. The illustration presented in this connection represents such a hospital. This hospital is forty-nine feet and two inches long, and twenty-two feet and nine inches wide. The floor is two feet and five inches above the ground. The side-walls are of sail-cloth, and may be raised or lowered at will, according to desire, or the state of the weather. The floor is made of hard wood, tongued, and is oiled or waxed. The roof is provided with a protected opening its whole length on each side. The hospital contains eight beds. The advantages of this hospital, are, its complete supply of light and fresh air, and absence of the hospital smell ; the attendant cheerfulness of patients ; the opportunity afforded by their use in summer of completely emptying the larger hospitals for the warmer six months of the year, and thus permitting the most complete disinfection and renovation of the larger buildings. Surgical wards periodically emptied and disinfected are more free from hospital gangrene than those continuously used. In winter, a double canvas wall may be used, and the tent comfortably warmed by stoves. The hospital, of which the illustration is given, is one used in connection with the cantonal hospital at Geneva, Switzerland. In the last issue of The Sanitary News mention was made of a portable hospital which was exhibited at the Toronto exposition by the provincial board of health of Ontario. Their model differs somewhat from the one shown in the illustration, the sail-cloth which is intended to close in sides, is stretched on frames, revolving on horizonial pivots. They may be more easily adjusted than loose sail-cloth, and when the sides are open, the sail-cloth is available as an awning and a protection from rain.



A Portable Pavilion Hospital at Geneva, Switzerland.

PHYSICIANS AND SANITATION.

To the physician, no progress has been made in public health unless a law is secured which will regulate the practice of medicine, and prevent quacks from practicing upon the credulity of people. By the treatment of quacks some injury is undoubtedly inflicted upon their patrons, who are led to apply to them by the gnawing disquiet of a brain encased in a diseased frame. But the prevention of medical practice by unqualified persons is a most contracted portion of the great scheme of sanitation. The aim of sanitary science is to place all people beyond the necessity of calling on a physician, be he good or bad. Sanitary science, if it is allowed perfection, will deprive medicinal administrators of their calling. Among the elements necessary to reach this point of healthy living are correct plumbing, ventilation, water-supply and sewerage, any feature of which is of more importance to the cause of public health than the regulation of medical practice

EZRA M. HUNT, M. D.

The portrait given below will be recognized by nearly every sanitarian in this country. There are few faces better known than this, and few workers in sanitary fields who are any more appreciated than its original, Dr. Hunt, the secretary of the New Jersey state board of health, and president of the American public health association. The New Jersey state board of health was established in 1876, and, because of his interest in sanitary affairs, Dr. Hunt was elected its secretary, a position which he has since held, at present being also the medical superintendent of vital statistics. Those who are fortunate enough to possess the reports of the board can recognize the exceeding practicability of the work done under the general executive direction of Dr. Hunt. His efforts have not by any means been confined within the borders of his own state, although that state has more reason to be grateful to him because of more direct benefit received from his labor. He has always contributed freely to the sanitary literature of the land, by papers read before the American medical association, the American social science association, the New Jersey sanitary association, the American public health association, and through the columns of *The Independent* of New York city, the sanitary department of which he has edited for several years. He was one of the original members of the American public health association, being one of its organizers in 1872, and he has been one of its most active members. In contemplating the beneficent results which have followed the philanthropic work of this association in shaping sanitary legislation, as well as the conditions of private life, Dr. Hunt can fairly take considerable credit to himself as being a leading spirit in the praiseworthy enterprise. The association itself recognized his deserved prominence by electing him president at the meeting at Indianapolis in 1882. At the coming meeting in Detroit, from the 13th to the 16th of this month, it is expected that he will preside. At this opportune time THE SANITARY NEWS presents to the members of the association the portrait of their presiding officer.

THE HOUSE INTERIOR.

ART and sanitary science have, within the last few years, invaded a new domain, and their influence is already felt in the house interior, beautifying, brightening and cleansing, and putting heart and enjoyment into what is still too generally considered only the daily treadmill of drudgery. Among all the so-called higher aims and purposes which are crowding upon the attention and ambition of women, there is none more important than that of honest, intelligent housewifery. To make a home whose harmony of outward objects shall be always restful and helpful in its suggestions of color and form, though it need be neither fine nor expensive; to teach honesty and genuineness even in the externals of daily life, and to select and prepare food which shall be healthful, appetizing, and as daintily arranged for one's own family as for the most honored guest, will offer opportunities broad and varied enough to satisfy the most ambitious housewife, if she be, at the same time, thoughtful and conscientious. Many a burdened woman will regard this as only an unattainable ideal, but, in many cases, the heaviest cares are those from which such a rational and genuine life would free her altogether. "I would rather my husband praised my dinner than my last book," said a woman of both literary and domestic abilities, and she spoke wisely. Had there been no dinner worthy of praise the book would have been to him only a grievance, while with his recognition of his wife's careful oversight in the home, came a deeper pride in her success in her literary work. A purer taste and a greater attention to sanitary laws ought to bring about a renaissance in the household which shall help to introduce

> The nobler modes of life,
> With sweeter manners, purer laws.

* * *

THE new colors in upholstery follow the autumn tints in dress fabrics, gray, in a variety of shades, being one of the most popular in the list. Some of the warmer tones of this color combine admirably with pink, blue or crimson, and are excellent for upholstery uses where the fabrics are rich in texture. Those shades which have a touch of warm color in them are the best, the silver and steel grays being unpleasantly chilly in effect. A recently furnished reception-room in a private residence has gray walls with a stenciled frieze showing figures in pink and silver, the design forming a border on the gray ceiling. The furniture is over-stuffed and covered with gray satin, the color being composed of black and white only, and the fabric having a silvery shimmer suggestive of snow. The only touch of color is in the large silk cord used as a finish, which has a strand of pink with the gray. Gray satin draperies and a crystal chandelier complete the furnishings of a room where, if color possesses any of the subtle influence ascribed to it, the hostess will be able to receive her friends as genially and cordially as she might at the north pole. Many shades of green are found in the new fabrics, those inclining toward olive being especially good, and combining well with all the brighter tints. Peacock blue is to be much used, especially in plush, and yellow continues in favor. The last named color, if used sparingly and with discretion, is very satisfactory, its warmth and brightness making it admirable for winter furnishing. All its shades appear in wall coverings and stuffs from cream color to old gold. Some warm shades of brown combine with it with rare effect. New shades of brown which are taking the place of the terra cottas of last season, are far more desirable. Terra cotta was only endurable in the richer fabrics, and its very general use in the cheaper qualities has made it deservedly unpopular.

* * *

BIRD'S-EYE maple is coming into more general use, especially for bedroom furniture. A small table of this beautiful wood folds diagonally through the middle, so that when the half which forms the leaf is let down the table is triangular in form. The leaf is raised and supported in its place by means of a moveable leg. This odd and novel table is admirable for the corner of a room, and when spread is of a convenient size for afternoon tea, or for a sewing table, if it forms part of a bedroom set. Many of the new hall hat-racks have large mirrors with brass hooks in the woodwork around them, and below broad seats hung on hinges and forming the covers of chests which are very convenient for holding coats and shawls. The most massive of these hall-stands are of mahogany or oak. Smaller and less expensive ones are made of walnut or unstained cherry. MARTHA HOWE-DAVIDSON.

WATER-CLOSETS.—II.

Sometimes latrines were directly adjoining dungeons with drain running to the cesspool (Fig. 13.) Sight-seers are frequently shown through these latrines, and are informed that the cesspools are dungeons, the agonies which have been endured by prisoners in their depths being graphically depicted by the guides.

Curiously enough, the first mention we have of a water-closet, properly speaking, after the ones used by the Romans, is connected with the publication of a poem by Sir John Harrington on the "Metamorphosis of Ajax" (a close stool or commode), published in 1596. This poem was occasioned, as Henry Harrington reports, by the author having invented a kind of water-closet for his house at Kelson. In the east, water-closets, or what may be called water-closets, seem to have been

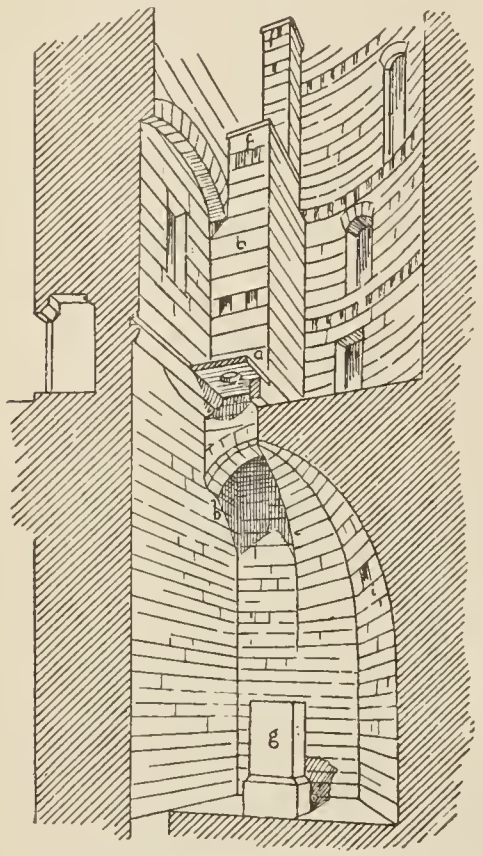


Fig. 12.—Perspective Sketch.

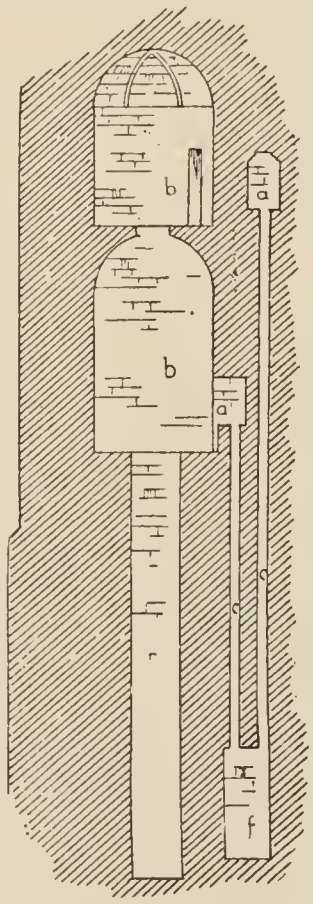


Fig. 13.

a, Latrine. *b*, Dungeon. *c*, Chute or Drain. *f*, Cesspool.

used at an early date. Ogilby, in a description of the city of Fez, says: "The river Fez subdivides into many clear-running channels through the streets, serving not only each private house, but churches, inns, hospitals and other public places, to their great convenience. Round about the mosques are one hundred and fifty common places of ease, built four-square, and divided into single stool-rooms, each furnished with a cock and marble cistern, which scoureth and keepeth all neat and clean, as if these places were intended for some sweeter employment."

Tavernier, in his "Relations to the Seraglio," says: "The places for the easing of nature are on the right hand divided into four little rooms, which are always kept very clean, and paved with square pieces of white marble. The Turks do not sit down as we do when we are in those places, but they squat down over the hole, which is not half a foot, or a little more, above the ground. The hole is covered with an iron plate, which rises and falls by a spring, and turning one way or the other, at the falling of the least weight upon it, resumes the station it was in before as soon as the ordure has fallen from it. I have observed that the Turks, and generally all the Mohammedans, do not use paper in such cases, or upon any indecent occasion, and when they go to those kind of places they carry along with them a pot of water, to wash themselves withal, and the iron plate is also made clean at the same time, and so the hole being always covered, and the iron plate always kept clean, there can be no ill smell in the place, and that the rather for the small current of water that passes under that place carries away all the ordure. * * * A gallery, which lies to the left hand of the bath, leads to places designed for the easing of nature, and every seat has a cock which supplies them with water to wash themselves after they are done." Baldwin Latham, quoting from Ewbank, would lead us to suppose the above-mentioned cocks were primarily for the purpose of washing the bowl of the closet, if there was one, while it was for the purpose of washing the person using the closet.

We see no mention of water-closets in Europe again until 1770. During the intervening period, while art had professedly entered into a new life, the useful arts seem to have been ignored. In England a close stool or commode, called an ajax, or jakes, was generally used. According to Viollet-le-Duc and other writers, cleanliness, the first principle of sanitation, was thought of very little importance during this period. Privies were used in Germany before they were in France. In Paris people were allowed to throw their excreta from the windows into the street, provided they gave the verbal warning, "*Gare l'eau*," three times. In Edinburgh the same custom prevailed; persons walking the streets had necessarily to cry, "Hauld your han," for fear of what might befall them.

The above practice was forbidden in Paris in 1395, but seems to have continued in Edinburgh until 1756. It was during this period also, that men walked the strects of Edinburgh carrying pails or buckets for the public covenience, and wearing a cloak large enough to envelope their customers and apparatus, crying, "Wha wants me for a bawbee." The Parisian code of laws improved in 1513 expressly ordered that every house should have a privy, but as late as 1700, A. D., the police were instructed to close all houses whose occupants did not provide one within a month. During the reign of Louis XIV. of France the courtiers found it necessary to ease themselves in the halls of the palace Versailles because there were neither privies nor water-closets. Viollet-le-Duc tells us that close stools were used in the palace of Versailles in the eighteenth century. He also writes of an old lady belonging to the court of Louis XV of France, who passed the halls of St. Cloud with him when a young man. The odor of an offensive vessel caused her to exclaim with pleasure, "This smell recalls the good old times." Some of our modern closets would have delighted the old lady.

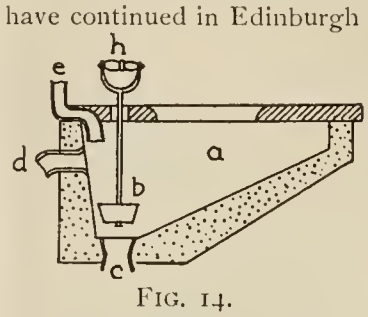


Fig. 14.

a, Bowl. *b*, Plunger *c*, Waste. *d*, Overflow. *e*, Supply. *h*, Handle.

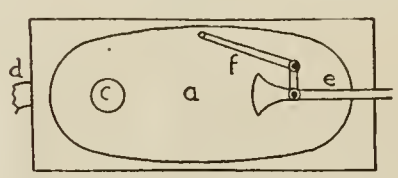


Fig. 15.—Plan, or Top View.

a, Bowl. *c*, Waste with plunger removed. *e*, Supply. *f*, Bidet-attachment. *d*, Overflow.

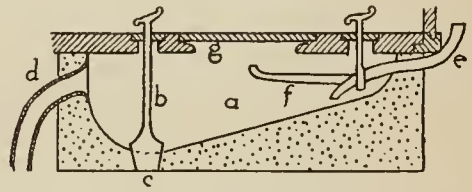


Fig. 16.—Longitudinal Section.

a, *c*, *d*, *e*, *f*, Same as Fig. 15. *b*, Plunger. *g*, Seat cover.

Privies were not used in Spain until about 1770, and have not been used in Warsaw more than fifty years. As late as 1846 we find in Berlin "small closets located on the landings of the stairs, which required to be emptied every other night, to the no great satisfaction of the olfactory nerves." Aubrey, writing in 1718, describes a water-closet which he had seen. He says: "Here (at Sir Francis Carew's, Beddington, Surrey), I saw a pretty machine to cleanse an 'house of office,' viz.: by a small stream of water, no bigger than one's finger, which ran into an engine made like a bit of a fire-shovel, which hung upon its centre of gravity, so that when it was full a considerable body of water fell down with some force and washed away the filth." This must have been very much like the closet seen in the city of Fez by Ogilby.

S. S. Hellyer gives a cut of a water-closet taken from Osterly House, which he considers a type of the closets used in England one hundred to one hundred and fifty years ago. Describing it he says; "A niche in a fair-sized room was formed to receive the marble closet-pan [bowl], and a door shutting up close to the seat hid the whole arrangement from sight. A lead soil-pipe was connected with the outlet-plug [plunger] waste of the pan, and continued from it to the drain, which was brought into the house to receive it. The soil-pipe had no ventilation." (Fig. 14.)

The main sewer at Southport, England, has a fall of only one foot in five thousand, but the flow of sewage is stopped at certain distances by gates, which are moved by hand, and in some sections of the sewer the fluid is stored several hours at a time. The health officer claims to have proved that it is not injurious to health.

THE SANITARY INSTITUTE OF GREAT BRITAIN.

The congress at Glasgow, Sept. 25–29, 1883, was held at St. Andrews hall, Granville street, the exhibition being in Burnbank drill hall on Great Western Road, some distance from the place of meeting. The exhibition was opened on Tuesday afternoon at 3 o'clock, by the Hon. John Ure, who is lord provost of Glasgow. The first session of the congress was held in the evening, when Prof. G. M. Humphry, M. D., F. R. S., delivered his inaugural address as president. He showed the interdependence of the physical, the mental, and the moral forces, and urged legislation which should improve physical conditions, thus indirectly improving the mental and moral tone. He urged the creation of a sanitary department in the legislature, distinct from the local government board, and under the direction of a minister of sanitary affairs, embracing the registrar-general's office, the ordnance and geological surveys, and the meteorological office. He urged increasing the efficiency of the sanitary service of the army and navy. The second portion of his address touched upon the evils of swathing infants, of tight shoes, of the sanitary effect of education, on ventilation, etc.

On Wednesday there were papers on sanitary science and preventive medicine, including a paper on the origin and prevention of typhoid fever, by Dr. J. Francis Sutherland, in which he treated of its etiology, and argued that the germs were found in decomposing fæcal matter, which, when introduced into the human body, multiplied and became virulent. In preventing it he would increase sanitary conditions of living, and would treat cases in special hospital wards, which could not be safely treated at home. Dr. Simpson read a paper on the origin and distribution of phthisis, and Dr. J. Christie, editor of *The Sanitary Journal*, read a paper on cholera epidemics. Gilbert Thompson, C. E., read a paper in which he mentioned some of the arrangements in house sanitation, both good and bad, which are commonly found in and around Glasgow. The chief points noticed were the dangers in a house from defects outside its own drainage system, in public sewers or neighboring houses; the forms and dangers of main traps; the material, construction and ventilation of house drains and soil-pipes; the water-closets used, special reference being made to the siphoning of traps; and the water-supply. The condition of country houses was also shortly referred to. Dr. Arthur H. Wright read a paper on the case of Southport, giving an illustration of the danger threatening the existence of a health resort. G. W. Muir read a paper on the sanitary condition of Glasgow, and the means of improving it. Cavalier Sebastian Fenzi, of Florence, read a paper on hygienic gymnastics in the dressing-room. In the evening, there was a pleasant conversazione given by the lord provost in the corporation buildings.

On Thursday there were papers in the engineering and architectural section. Prof. T. Rôger Smith, F. R. I. B. A., read a long paper on London dwellings, in which he outlined the physical, social, and legal conditions of London, which affected the erection of dwellings. The character of London houses, as outlined in the paper, is not of the best, or even of average, quality. E. C. Robins read a paper on the disabilities of inspectors of nuisances and their remedy, detailing the peculiar conditions which handicap these inspectors in their endeavors to do good work. James Stewart, Sr., read a paper on the testing of drains and other pipes, describing the smoke, peppermint, paraffine, and water tests. W. P. Buchan, read a very short paper on the ventilation of street sewers. A paper was presented by Daniel Emptage on the merits and demerits of various kinds of water-closets. William Wallace, Ph. D., read a paper on some sanitary aspects of house construction, a portion of which will be found in another column. John Honeyman presented a paper on the advantages of low ceilings in small houses, which had especial reference to ventilation. John Young read a paper on the scavenging of towns. A paper on middle-class dwellings was presented by Henry C. Burdett, F. S. S., who has often had papers on dwellings of the poor. He stated that overcrowding was increasing; in 1861, for each one hundred people in the country, there were one hundred and sixty-five in the cities; in 1871, the last number had increased to one hundred and eighty-four, and in 1881 to one hundred and ninety-nine. In Glasgow, forty-one out of each one hundred families live in single rooms. He described the houses in construction for the middle classes. In many districts good regulations were simply dead letters. One soil-pipe he described had six angles, and was ventilated at the top by a one-half-inch tube! He recommended local associations of householders which should defend the members from the wrongs now practiced. In the evening, Dr. Benj. Ward Richardson gave a long and characteristic lecture on "Felicity as a Sanitary Research."

Friday was devoted to the subjects of chemistry, meteorology, and geology, of which the most prominent was an address on air as a sanitary agent, by R. Angus Smith, Ph. D., the well-known author of "Air and Rain." In the evening a public dinner was given in St. Andrews halls, which proved to be a very brilliant affair.

Saturday was devoted to excursions to Ardrishaig.

THE SANITARY NEWS has made as complete a report of the proceedings as its space permits. In future issues it will print, in full, some of the papers of which the titles only, are now given.

SOME SANITARY ASPECTS OF HOUSE-CONSTRUCTION.*–I.

Last winter I read a paper on building-stones to the members of the architectural section of the philosophical society, and the subject attracted a good deal of attention among the architects and builders in the city; especially as it had a direct bearing on the selection of a stone suitable for the erection of the magnificent pile of buildings about to begin by the corporation of Glasgow. An opinion was also expressed that the chemist might give valuable information, and make useful suggestions to the architect and builder if he would devote his attention to the construction of buildings. The encouragement received on that occasion has induced me to bring before the architectural section of the sanitary institute a short paper on some of the sanitary aspects of house construction, excluding entirely from consideration the important subjects of drainage and sewerage, which I leave to others who have made them a special study.

Granting, then, that a house is well drained, and that the plumbing-work is properly trapped and ventilated, what is wanted to make it a healthy residence is that it should have plenty of light, and that it should contain at all times air pure and dry, or at least as pure and as dry as may be possible. The subject of light may be dismissed in a few words. The importance of having larger windows is perfectly understood, and so far as isolated buildings are concerned it is unnecessary to say anything. But as regards street architecture, it is of the utmost importance that houses should be built of a height bearing a direct relation to the breadth of the street in which they are situated; hence the paramount importance of having enacted by parliament rigid building regulations for cities and towns, in order to prevent the erection of tenements of such a height in proportion to the breadth of the street that the windows in the lower stories get little or no sunlight. This is a subject which has been thoroughly discussed in this and other cities, and I hope that in course of time more stringent rules than we at present possess will be enacted. A fair proportion in this latitude is that the house should not exceed in height two-thirds of the breadth of the street; thus giving three stories in height for a street of forty-five to fifty feet wide, and four stories for one of sixty to seventy feet. I say, advisedly, in this latitude; for while at the equator the sun at mid-day is perpendicular or nearly so, in high latitudes it forms with the earth's surface an angle more or less acute. Hence, a street in Cairo of only fifteen or twenty feet wide may be better lighted than one of forty or fifty feet in Stockholm. As regards the direction of a street, I should prefer to live in one placed as nearly as possible north and south; in this case, and taking the west side of the street as an example, the sun shines from morning till mid-day in the front, and from mid-day till evening in the back of the house. But in a street running east and west, the houses on the south side get scarcely any direct sunlight—in winter none at all—in front; while those on the north side are equally unfortunate as regards the back rooms. No apartment can, in my opinion, be considered a perfectly wholesome one which does not enjoy direct sunlight during some part of the day. But, if an apartment must be so situated that it cannot have sunlight, it is some compensation that it have very large windows, so that it may get as much diffused daylight as possible.

Purity of air cannot be maintained in a house unless it be thoroughly dry. Setting aside the not inconsiderable quantity of water produced by our own breathing and by the combustion of gas, oil, and candles, the air in a house is liable to be rendered unwholesome from excess of moisture, first, by absorption of water from the rock or soil below, and, second, from the porous stone of which the building is constructed.

* Paper read September, 27, 1883, at the Congress of the Sanitary Institute held at Glasgow. by WILLIAM WALLACE, Ph. D., F.R.S.E., F.C.S., F.I.C., President of the Philosophical Society of Glasgow.

Not only is the air loaded with moisture from these sources, but it is rendered impure from the exhalations of fungous vegetation, or dry-rot, which, at the same time destroys the joists and other carpenter work, and seriously affects the stability of the house. It is a mistake to suppose, as many do, that dry-rot attacks only the wood in the basement story. It is a common occurrence for the ends of joists built into porous stone to become affected by fungous vegetation; and it is frequently seen in pulling down old tenements that the ends of the joists are quite gone, and that, probably, for many years the joists have been resting only on the plaster cornices of the rooms. The remedy is the use of "shoes" of glazed fire-clay or other material, which are built into the wall, and into which the ends of the joists are placed. The "shoes" should be somewhat larger than the joists, which should be kept in position by little wedges of wood, so that air can play freely around the end of the joists. Such protected joists will last for hundreds of years, if other circumstances are favorable.

The porosity of most varieties of building stone is remarkable. In the paper to which I have already referred I have given, besides other properties, the quantity of water capable of being absorbed by the stone when air-dried. By weight it ranges from 3.4 per cent. in the celebrated Craigleigh stone to 7.2 per cent. in the red sandstone found at Wemyrs bay, on the Firth of Clyde. The significance of this property of porossity is still more readily appreciated if we take the amount of water absorbed by bulk instead of weight. One hundred parts by measure of the hardest and best freestone take up about eight parts of water, and the inferior kind twelve to fifteen parts. A cubic foot of the stone will therefore absorb from five to nine pounds of water, or from half a gallon to nine-tenths of a gallon. The absorption of water by certain kinds of stone is so rapid that in slight showers of rain the whole of the water that falls is imbibed; and, although a great part of this evaporates afterward from the surface of this stone, a portion must always find its way inward, and this is especially the case when the surface of the stone is kept constantly wet by continued rain.

Another property of freestone is its power of permitting the passage of air or other gas by transpiration and diffusion. A cube of stone varnished over on four sides and enclosed at the other two in an air-tight case provided with inlet and outlet tubes, permits the passage of coal gas to such an extent that the gas can be lighted and will continue to burn, even although the the pressure is not more than an inch of water. The same thing applies to other building stones which we, more or less, possess, and to bricks, unless these have been exposed to a temperature high enough to flux the marerial of which they are made. The quantity of air diffused into and out of a house by the walls must be very considerable, and as it is a process that is constantly going on, it must necessarily exercise an appreciable influence in maintaining the purity of the air in dwelling-houses. If, however, the stone or brick is saturated with water, the porosity is, for the time being, destroyed; or if there is any air diffused at all it will be loaded with watery vapor, and therefore of less value, in a sanitary point of view, than it would be with only its normal proportion of moisture. Besides this evil, there is the more serious one of the water actually reaching the joists and other wood, such as "dorks" and wall plates and straps, and causing these to decay, and so interfere with the stability of the structure. Coating the stone with oil, paint, silicate or soda solution, or other means of rendering it impervious to water, prevents the absorption of rain; but it also, at the same time, destroys the valuable property of diffusing pure air into, and impure air out of the house. The only way that I know of for securing the advantages of the porosity of the stone and preventing the injurious action to which I have referred is to have double walls, with a space of a few inches between, into which air is freely admitted by openings in the wall at top and bottom, placed in such a manner that rain will not enter by them or lodge in them. The openings may be about three inches square, and placed about six feet apart, and they should be sloped upwards for the reason I have just stated. The inner wall may be of brick, either four and one-half or nine inches thick, according to the height of the building, and it should be tied into the outer wall by pieces of thick iron wire with angled ends. The system of building with concrete blocks pursued in Sandown, Ventnor, and other places in the Isle of Wight, is well adapted for constructing walls on the principle I have indicated. The blocks of concrete are about eighteen inches wide by twelve, and are of two thicknesses, those for the outer wall being four or five inches, and for the inner about three or three and a half inches in thickness, and these are tied together by pieces of iron wire, with a space of about three inches between them. This forms what looks, to those accustomed to the two-feet thick solid walls of Scottish houses, a very flimsy wall, but it appears to be sufficiently strong for a building of two stories in height, and with a few openings above and below for the admission of air into the space between the outer and inner walls, it would form a structure which, in a sanitary point of view, would be perfect, although I would prefer to have the inner wall of brick, which is more porous than the blocks of concrete, formed of fine gravel and cement, which are used in the Isle of Wight.

THE CHICAGO MASTER PLUMBERS.

At the last meeting of the Chicago master plumbers, held on the evening of October 17, a discussion was had on the question of waste of water in cities. Opinions varied, some contending that the use of water for flushing purposes, although extravagant, was not a waste; too much could hardly be used for cleansing drains and sewers, and a city could well afford the expense, rather than have foul sewers and drainage. The statement was made by Mr. Thomas Kelly that fully fifty per cent of the water passing through the pumping-works of Chicago was wasted,—not so much by extravagant flushing, as by a constant dribbling through imperfect faucets, or those which were improperly controlled. He thought that a small stream of water running into a waste-pipe or soil-pipe and trickling along a narrow channel on one side of the pipe was absolutely of no service. Mr. James McGinley thought that imperfect flushing was due mainly to the small size of the pipes supplying and emptying the flushing-tanks; a half inch pipe was used in both cases, when it should be one inch in size at least; this would insure the filling of the tank in all cases, and such a vigorous discharge of the water as thoroughly to wash out any closet. Others expressed the opinion that a little water constantly dripping into a trap insured a continual change of the water, and hence prevented stagnation and decomposition

A letter was read from Mr. Robert Brown, of the "Paisley Sanitary Earthenware Works," Scotland, who stated that he would send to the Chicago association samples of their various manufactures.

The committee on constitution and by-laws for the national association reported, through Mr. J. J. Wade. All except the preamble was merely formal. The preamble stated the objects of the association; this was published exclusively in The Sanitary News of July 1. The report was laid over for two weeks.

Mr. John D. Dennison, of No. 146 N. Clark street, was proposed for membership, and Messrs. Foskett & Brown were elected members.

Mr. D. J. Rock proposed that, at each meeting, the question be asked: "Is any one in need of men?" or, "Does any one know of a man out of employment?" and that each thus assist the other in securing help, and positions for those who need employment. A motion was passed making this a regular feature of the meetings of the association.

THE SANITARY COUNCIL OF KENTUCKY.

The second semi-annual meeting of this council was held at Glasgow, October 2. Dr. R. N. Grimstead presided, and Dr. J. N. McCormack was elected permanent secretary, The chairman, who is the health officer of Glasgow, read a paper on the adulteration of medicines, with especial reference to its prevention. Dr. J. S. Leach read a paper on the restriction of small-pox. Dr. J. W. Holland, of Louisville, read a paper on cholera, citing the history of the disease in Kentucky in 1873, to support the view that it is a miasmatic disease, contagious in character, and could be controlled by cleanliness, isolation and the careful disinfection of all discharges. In the evening, a large audience listened to a paper by Dr. R. M. Alexander, on the reasons for sanitary legislation, a paper by Dr. Pinckney Thompson, of Henderson, on domestic hygiene; a paper on the reciprocal relations of the people and the state board of health, by Prof. L. Eddy, of Danville; a plea by Dr. McCormack for the teaching of hygiene in the schools; and an address on school hygiene, by A. W. Mell, of Glasgow. The council is a voluntary organization devoted to the public health interests of the state, entirely distinct from the state board of health. The next meeting will be at Bardstown in April, 1884, when more time will be given to the meeting.

Eight physicians were recently arrested in Philadelphia, for failing to report cases of diphtheria.

CURRENT PUBLICATIONS.

BARNS AND OUTBUILDINGS.

To the person who wishes to build any outbuildings from a Martin box to a "Cornell university barn" the pamphlet noticed with the above title will prove very convenient. There are one hundred and four plans covering every kind and style of an outbuilding. The plans give the elevations and floor plans with a description which will enable any carpenter to construct them. It is published by R. W. Shoppell, 24 Beekman street, New York, at 50 cents.

STEAM HEATING.

This little book from the press of Van Nostrand treats practically of the heating of buildings by steam, and is written by Robert Briggs, C. E., who has introduced several improvements in the apparatus employed for such purposes. The book treats of the subject under the heads of wrought iron welded tubes, couplings, boilers, circulation of steam for warming, clothing of steam mains, stop-valves, radiators and ventilation combined with warming. In an appendix are given data for computing the necessary problems connected with steam-heating.

HYDRAULIC TABLES.

P. J. Flynn, C. E., has in this work compiled a series of tables, containing the calculations which are necessary to be made in determining the discharge through sewers, pipes, and conduits. Kutter's formula is used, and in the formula the natural coefficient depending on the lining of the channel over which the water flows is taken at .015, which is the value adopted by the late Mr. Trautwine and by Mr. Rudolph Hering. In the tables 185,456 channels are given. This volume is published by Van Nostrand, also, and both this and the preceding are sold by Jansen, McClurg & Co., of this city.

AMERICAN NEWSPAPER ANNUAL.

The volume of this valuable publication for the year 1883 is unusually complete. It contains a carefully prepared list of all newspapers and periodicals published in the United States, territories and Dominion of Canada, with information regarding their circulation, issue, date of establishment, political or other distinctive features and advertising rates. It gives also the population of the cities and towns, as well as of the counties in which they are published. The work is published by N. W. Ayer & Sons at Philadelphia.

NORTH AMERICAN REVIEW.

This well-known monthly for November contains two important scientific articles—"Solar Physics," by Prof. Balfour Stewart, and "Modern Explosives," by Gen. John Newton. There are also general articles of an interesting nature from leading writers and practical men.

PUBLICATIONS RECEIVED.

"Water Pollution-Wells." By Irving A. Watson, M. D., Secretary of the State Board of Health, Concord, N. H. Reprinted from transactions of N. H. Medical Society, 1883. Concord, N. H.: Printed by the Republican Press Association. 1883. Pam. 8o. pp. 19.

"Sketch-Book of the Inter-State Exposition, Chicago, Wednesday, September 5, to Saturday, October 20, inclusive, 1883." R. R. Donnelley & Sons, Lakeside Press, 140 to 146 Monroe street, Chicago. Third edition. Price, 25 cents. Pam. 40.

"Steam Heating: an Exposition of the American Practice of Warming Buildings by Steam." By Robert Briggs, M. Inst. C. E. New York: D. Van Nostrand, 23 Murray and 27 Warren street. 1883. 16 mo. pp. 108. 50 cents. Chicago: Jansen. McClurg & Co.

"Hydraulic Tables for the Calculation of the Discharge through Sewers, Pipes, and Conduits; based on Kutter's Formula." By P. J. Flynn, Civil Engineer. New York: D. Van Nostrand, 23 Murray and 27 Warren street, 1883. 16 mo. pp. 134. 50 cents. Chicago: Jansen, McClurg & Co.

"For Girls: A Special Physiology; Being a Supplement to the Study of General Physiology." By Mrs. E. R. Sheperd. Illustrated. Fourth Edition. New York: Fowler & Wells, 753 Broadway. 1883. 8o. pp. 225.

"Tokology. A Book for every Woman." By Alice B. Stockham, M.D. Third Edition. Sanitary Publishing Co., 159 La Salle street, Chicago. 1883.

"Circulars of Information of the Bureau of Education. No. 2.—1883. Coeducation of the Sexes in the Public Schools of the United States. No. 3.—1883. Proceedings of the Department of Superintendence of the National Educational Assoeiation at its Meeting at Washington, February 20–22, 1883." Washington: Government Printing Office. 1883.

"The Work of Health Officers and of Local Boards of Health in Michigan, Including Duties under Laws Amended and Passed in 1883." Circular 64 of the State Board of Health. Pam. pp. 12.

"The Mexican Financier. A Weekly Review." Vol. II. No. 25.

"The Plumber and Decorator and Journal of Gas and Sanitary Engineering." London: October 1, 1883.

"The Genius of Medicine." Annual Address presented to The Florida Medical State Association, 1882. By Rob't B. S. Hargis, M. D., of Pensacola. Reprinted from the New Orleans Medical and Surgical Journal, July, 1882.

"The Sewerage of Paris." By Geo. E. Waring, Jr.

"Annual Report of the Board of Regents of the Smithsonian Institution, showing the operations, expenditures, and condition of the institution for the year 1881." Washington: Government Printing Office, 1883.

"1883. National Health Society. Tenth Annual Report read at the general meeting of the society, January 5, 1883." London. 1883. Pam. pp. 32.

"Medical Education and the Regulation of the Practice of Medicine in the United States and Canada. Illinois State Board of Health. 1883." Pam. 191.

"Sanitary Institute of Great Britain. Sixth Congress, to be held in Glasgow from 25 to 29 September, 1883." Programme.

"Transactions of the Medical and Chirurgical Faculty of the State of Maryland." Eighty fifth Annual Session, held at Baltimore, Md., April, 1883. Pam. pp. 302.

"Manitoba. Crop Bulletin Nos. 4 and 5."

"Soap and Water." An illustrated tract issued by the Australian Health Society, Melbourne.

NOTES AND NEWS.

ANNOUNCEMENTS.

Nov. 13–16, at Detroit, Mich. Eleventh Annual Session of the American Public Health Association.

Nov. 15 and 16, at Chicago, Ill. Conference concerning contagious diseases among domestic animals.

Nov. 16 and 17. At London, Ontario. Sanitary Convention, under the auspices of the Provincial Board of Health.

December 6. At Indianapolis. Regular meeting Indiana State Board of Health

January 1, 1884. At Nashville, Tenn. Regular meeting of the State Board of Health.

HEATING AND LIGHTING.

Gas works will be built at Big Rapids, Mich.

Atlanta, Ga., is to have a new gas company.

BIDS AND CONTRACTS.

Lowest bids on the extension of the Chicago West-side pumping works were as follows: Painting and glazing, $575; iron work, Central Bridge Co., Buffalo, $13,500; cut-stone, masonry, and carpenter work, $13,923.

PREVENTABLE DISEASES.

A health officer in London claims to have traced to the immediate effects of sewer-gas, the following diseases: Submaxillary abscess and enlarged cervical glands, cervical abscesses, axillary and inguinal abscesses with summer diarrhea, facial, pelvic, temporal, and multiple abscesses, typhoid fever, diphtheria, puerperal septicemia, and summer diarrhea.

Ah Tip, a Chinese leper, was discovered by the police of San Francisco, a few days ago.

Revaccination has just been made obligatory in all the colleges and lyceums of France.

One death from diphtheria has recently occurred in the Michigan reform school at Lansing.

Measles prevails in the New York infant asylum at Mt. Vernon.

Dr. Wirt Johnson, secretary of the Mississippi state board of health, telegraphed Oct. 11 that Dr. Shannon reported a case of yellow fever at or near Ocean Springs, Miss.

A new hospital for contagious diseases was opened last month at Maidstone, England.

A meeting of representatives of commercial bodies was held in New Orleans, Oct. 11, to endeavor to find means for eradicating small-pox before the arrival of cold weather.

Small-pox has caused an almost unprecedented number of deaths in Tapachula, state of Chiapas, Mexico, and is still raging.

Yuma will probably be selected by the California state board of health, as an inland quarantine station against the fever in Mexican cities.

A report was received last month of the death of four adults from diphtheria in one family in Verona, Wis. The youngest was fourteen years old.

SEWERAGE.

Atlantic City, N. J., has contracted with a company which will, by good sewers, remove all sewage to a pumping-station outside the city limits, thence three miles away, where it will be made into a compost.

Worcester, Mass., will send its engineer to Europe to investigate sewerage systems. Why not have him read Mr. Rudolph Hering's

admirable report on the same subject, and save the time necessary to a personal visit?

Cincinnati has just completed twelve miles of sewerage, under the direction of J. A. Ridgeway, city engineer.

DISEASES OF ANIMALS.

Dr. Salmon, a veterinarian connected with the governmental department of agriculture has just made a report in which he states that the Texas cattle fever might, with propriety, be called the southern cattle fever, inasmuch as it has spread all over the south, and is now indigenous to many other states than Texas.

The cattle quarantine at Quebec was established in 1875. It is estimated that of the cattle imported for the United States west of Ohio, at least seventy-five per cent are imported by way of Quebec.

VITAL STATISTICS.

The death-rate of Grand Rapids, Mich., for the month of September was but 13.4 per 1,000, in a population of 35,000.

The city of Milwaukee, with a population of 138,800, is deservedly proud of the fact that for the forty-eight hours ending with the close of business at the health office, October 17, not a single application for a burial permit was made, and but one permit issued, that being for a still-born child.

WATER-SUPPLY.

The water famine in New Orleans has been very severe, many people using water from the drainage canals, and from the gutters as flushed by the sanitary association.

New water-works for Lake View, Ill., Boone, Ia., and Dalton, Mass., are promised.

Water-works will be established at Aberdeen, Dakota.

An artesian well will be sunk in Evanston, Ill., by the Gray Brothers, of Milwaukee. Many water-mains will be laid.

The water-works company cannot be held responsible for the water-famine in New Orleans, but the legislature did wrong in reducing the amount necessary for each house.

Iron water-mains have superseded the masonry conduits of Mexico. The old stone aqueduct will probably soon go out of use also.

For a water-main from Lake Vadnais over Rice street, in St. Paul, Minn., the city will require five thousand tons of pipe, twenty-four and thirty inches in diameter.

Holyoke, Mass., is to have a new reservoir of seventy-five million gallons capacity.

SANITARY SOCIETIES.

The national health society of England had delivered under its auspices, in 1882, one hundred and twelve lectures. In many poor neighborhoods, the lectures were free.

At an international medical congress in Amsterdam in September, a committee was appointed to report upon a plan for an international association to deal with epidemics.

BOARDS OF HEALTH.

At the meeting of the Michigan state board of health last month, it was decided to hold a sanitary convention at Ionia in December, and one in Hillsdale, the time to be hereafter fixed. The board will print a leaflet on the restriction of communicable diseases in the Scandinavian, French, and Polish languages.

The Illinois state board of health held a meeting in Chicago last month. During the quarter the board has issued certificates to one hundred and one physicians and fifteen to midwives; twenty-three certificates were refused. Dr. Rauch recommended that at the close of navigation the Bridgeport pumps be worked to their greatest capacity all winter, pumping water from the Chicago river into the Illinois canal, in order to relieve the river and remove the danger of contaminating the water-supply of Chicago in the spring, when the freshets wash the sewage far out into the lake. He also stated that it was broadly hinted that the pumps did not have a capacity of sixty thousand gallons per minute. The board examined several candidates for medical practice.

By a veto of Gov. Cleveland, the New York state board of health is without funds to enforce the laws regarding the adulteration of food and the inspection of kerosene. The general appropriation for the work of the board was $20,000.

Dr. C. W. Covernton, of the provincial board of health of Ontario, has been made a Foreign Corresponding Member of the Spanish Society of Hygiene of Madrid.

There is no health officer of the city of Madrid, the sanitary administration being under the charge of the national authority.

There is no national board of health in Ecuador, nor is there any health officer in Quito, its capital.

The Tennessee state board of health will send a delegation of three to the meeting of the American public health association, at Detroit.

The Michigan state board of health has appropriated $500 for a microscope and accessories.

MISCELLANEOUS.

The manufacture of cigars in tenement houses is meeting with legal obstruction in New York city.

Dr. Charles H. Crane, surgeon general of the U. S. army, died Oct. 10. He had only held the office one year. Among the pall-bearers was Dr. J. M. Browne, in charge of the naval museum of hygiene.

BUILDING INTELLIGENCE.

CHICAGO.

The old distillery at the corner of Market and Adams streets, which has been an offense to the eye and nostril so long, will soon be removed and a substantial six-story building for a wholesale boot and shoe house will be erected. The plans are in the hands of Architect Wadskier.

Parmly and Rollins are to build a three-story and basement building on Market street, between Jackson and Van Buren streets. It will be constructed of Anderson pressed brick with stone copings and belt courses. The Market street front will be largely of plate glass. The floors will be free save an office on the first floor. The basement floor will be of asphalt,—the others marble. Driveways will be constructed in the building to facilitate shipping goods. F. L. Charnley designed the plans.

The corner-stone of the new court-house of Porter county, Ind., designed by J. C. Cochrane, of Chicago, was laid at Valparaiso, on Oct. 24. There was a large attendance of civil bodies at the ceremonies.

W. W. Boyington has been granted a patent for a window frame.

BUILDING PERMITS.

Since the last issue of The Sanitary News 190 building permits have been issued in this city. The following is a list of all costing $2,000 and upwards, with the name of the owner, architect and builder—if only one name is given it is that of the owner. All buildings are of brick unless otherwise specified:

193 Canalport av., 2-story dwelling, 21x44, $3,000; owner, A. Larson; builder, August Loula.
19 Plum and Johnson sts., 2-story dwelling, 21x44, $3,500; owner, W. Harrieon; builder, Augnst Loula.
223 and 225 W. Sixteenth st, 1 warehonse, 50x88 $4,000; owners, Curtis Bros.; architect, McCormick; builders, McCormick and Gallaghan.
816 Indiana st., 2-story dwelling, 21x60, $2,300; Alexander Bierma.
1 and 3 Groveland Park, 2 3-story dwellings, 42x56, $10,000; owner, W. F. Mysiek; architects, Cobb and Frost; builder, J. Griffith.
3029 Portland av., 1-story dwelling, 21x36, $2,000; A. Knobb.
942 Milwaukee av., 4-story store dwelling, 24x78, $10,000; W. Mayne.
52 to 56 Illinois st., 4-story machine shop, 75x60, $20,000; owner, Robert Farrant; architect, Theo. Karls.
448 and 450 Congress st., 3-story flats, 50x74, $15,000; owner, Henry Furst; architects, Furst and Rudolph.
22 Chapin st., 2-story store and dwelling, 20x60, $2,400; P. Rozlawske.
3008 Butler st., 1-story cottage, 22x44, $3,000; Fred Hess.
281 and 283 W. Superior st., 4-story factory, 40x96, $7,000; Horn Bros.
186 and 187 Michigan av., 6-story flats. 52x100, $35,000; Leroy Payne.
474 W. Harrison st., 2-story dwelling. 23x36, $4,000; J. Gillon.
225 Cleaver st., 2-story dwelling, 21x60, $4,000; John Wilkowski.
232 and 234 W. Eighteenth st., 3-story dwelling, 40x60, $8,000; owner, Rev. A. Damon, architect, John Dillinbaugh; builders, Tobin and Turner.
394 Garfield av., 3-story flats, 40x43, $6,500; owner and builder, Andrew Almert; architect, John Otter.
3132 Groveland Park, 2-story dwelling, 21x45, $3,500; owner, J. D. Hall; architect, Jno. D. Clifford; builder, N. D. Safford.
3448 and 3450 S. State st., 3-story store and flats, 48x66, $15,000; owner, D. Harry Hammes; architect, Wm. Longhurst; owner, A. Bemont.
823 to 827 Larrabee st., 3 2-story dwellings, 80x46, $15,000; owner, C. P. Buckingham; architects, Fromman and Jelsen; builder, Charles Thiele.
873 to 877 Polk st., 5 3-story store and flats, $20,000; owner, Jno. Hoffman; architect, Alf. Smith; builder, Louis Daegling.
84 Bryson st., 2-story dwelling, 22x51, $2,200; owner, A. Wallen; builder, F. Wallender
761 and 763 Lake st., 2-story dwelling, 50x40, $4,500; L. A. Babcock.
246 and 248 Twenty-first st., 3-story dwelling, 22x60, $13,000; Enos Slossen.
79 Hammond st., 2-story dwelling, 23x60, $4,000; owner, Patrick O'Malley; architect, John Otter; builder, Chris. Luehring.
300 Augnsta st., 2-story dwelling, 20x48, $2,000. John Schroeder.
2883 Main st., 2 story store and dwelling, 22x50, $2,700; Henry Glaman.
646 Wells st., 3-story store and dwelling, 31x67, $10,000; owner, Mathias Kaefer; architects, Cudell and Blumenthal; builders, Aug. Kueker & Co.
199 and 201 Mather st., 2-story dwellings, 44x36, $3,500; M. Farrant.
500 N. Carpenter st., 3-story factory, 76x76, $6,000; owners, Fries Bros.; architects, H. Sierks; builder, F. Hansen.
538 W. Jackson st., 3-story dwelling, 24x60, $6,000; owner, Mrs. Hale; architect, L. G. Hallberg; builder, Geo. Lehman.
1508 Michigan av., 2-story dwelling, 25x70, $8,000; owner, W. J. Knight; architects, Dixon and Townsend; builder, Geo. Lehmann.
1034 to 1038 W. Jackson st., 3 2-story dwellings, 50x50, $9,000; owner, R. R. Williams; architect, J. W. Longhurst.

(*Continued on page viii.*)

Current Topics.

A complete report of the proceedings of the American public health association, held at Detroit this week, is given in this issue of The Sanitary News. This is the most important body dealing with sanitary matters in this country,—important because it has been in existence a longer time, and numbers among its members more prominent and influential men than any similar organization. The apparent tendency to discuss sanitary science from a medical stand-point is due to the fact that many of its members and original founders were physicians, who can not be expected to ignore their profession. But sanitary science and the science of medicine—even if it is allowed that there is a science of medicine, in the sense of a scientific cure of disease,—are absolutely distinct. It is encouraging that this fact is being recognized; the papers and discussions at the Detroit meeting indicate this. While everybody should become a sanitarian and know something, at least, about the rudiments of a science which has more to do with the well-being of humanity than all the abstract sciences, the physician, especially, should haste to become the sanitary teacher and adviser of the people, on a scientific basis, as well as the curer of sickness, on a basis which has never yet been shown to be truly scientific, and thus preserve health and prolong life. The report will be read with interest.

Basing its opinions upon distorted statements which have been going the rounds of the press, *The American Architect* seems to doubt the success of sewage farming at Pullman. The facts with reference to this matter were given in The Sanitary News of October 1—pages 126 and 127, Vol. II, No. 23,—in an exhaustive article; as to the correctness of the statements there made, it may be said that the proofs of the article were submitted to Mr. E. T. Martin, superintendent of the farm, before it appeared in this journal. The year had not closed when this report was made, and some of the figures were based on estimates; but the crops had all attained their growth and a portion of them were harvested. Their estimated value could hardly have been exaggerated. After giving, in detail, the kinds and extent of all the products of the season, the superintendent fixed their value at $12,500. The total investment, including land, was $80,000, and the expenses of operating the farm for the year, $8,000. The value of the crops, less the cost of producing them, shows a profit of $4.500, or more than 5.6 per cent. profit on the investment. But the article went further and showed why the expense of operating the farm for this, the first, year was much greater than it will be hereafter, and the production less. The superintendent gave figures which, he assured the The Sanitary News, would be realized next year, and which would represent a profit of 8 to 10 per cent. on the investment. So much for the financial view of the undertaking. The disposal of the sewage of a town of eight thousand inhabitants without detriment to the health of the people and without creating the least nuisance, is a consideration not to be overlooked. Pullman does not know that it has any sewage, so quickly and inoffensively is it removed. As to the health of the inhabitants, the reader is referred to some figures given in an article by Dr. Oscar C. DeWolf, commissioner of health of this city, on another page of this issue of The Sanitary News, who has considered Pullman from a sanitary stand-point. While *The American Architect* thinks that "there is nothing inherently improbable in the Pullman rumor," it predicts "with confidence that no more pipes will ever be built for spoiling rivers and harbors with filth," if it really proves true that "a single town of seven or eight thousand inhabitants has been able, by distributing its sewage upon land selected for that purpose in its vicinity, to gain in return a net profit large enough to pay 5 per cent. interest upon the cost of the sewerage system and the irrigated territory."

This is a matter of almost vital importance to the city of Chicago. Those who have followed the series of historical articles on Chicago sewerage in The Sanitary News—not yet completed,—can not, it would seem, come to any other conclusion. Those who live here know what an abomination the sewage of this city is, and has been for years. Mr. Chesbrough, the eminent civil and sanitary engineer, who planned the system in use, foresaw the dangers arising from the disposal of the city's liquid wastes, and gave timely warning; but the municipality has, for almost thirty years, stood in awe before its foul and disease-disseminating sewage, not only allowing it to run its course till its own power for evil was exhausted, but actually turning it into the fountain of its water-supply, and compelling the inhabitants to drink it. When not contaminating the water-supply of this city, it has been driven into a channel which leads to the sources of water-supply for other cities. It has disgusted a whole state, and prostrated and destroyed by disease hundreds and probably thousands of people in the interior of Illinois. There are thousands of acres of waste land surrounding Chicago on every side, waiting only to be underdrained and fertilized to yield as abundantly as the sewage-farm at Pullman. The sewage of Chicago can be as easily and as inoffensively collected and applied to the barren fields south and west, as at Pullman. It is objected that the outlay in a separate system of sewers, by which the sewage could be collected separately from the storm-water, and in pumping-works, distributing pipes, etc., would involve an extraordinary expense. But the city coolly erects pumping-works at Fullerton avenue and Bridgeport which cost hundreds of thousands of dollars, and which are absurdly unequal to the task expected of them, granting that they were not conceived in error. It is also suggested, without alarm at the expense and with unreasonable confidence in the success of the plan, that the Illinois and Michigan canal be enlarged sufficiently to carry the city's sewage to the Mississippi. This question must soon be settled; the future of Chicago depends upon it. If the sewage were collected as at Pullman, it is beyond doubt that it could be sold,—not that somebody would have to be paid to take it. If Pullman sewage pays a profit on the total investment in sewers, pumping-works, distributing-pipes, etc., it is absolutely certain that, under the same circumstances, Chicago sewage would pay a larger profit to some one who was asked only to take it when collected. With the separate system of sewers and pumping-works once built, the cost of operating the latter and keeping the former in repair could be more than realized. It is time that impracticable schemes, and those which will continue the existing dangers to the city, were abandoned, when a solution to the whole question seems so easy and practicable.

On November 5, one of the daily papers of Chicago stated that a flock of nearly one hundred sheep had arrived at the stock-yards affected with the "snuffles," a disease which made the meat unfit for food. It was also stated that the sheep were killed and sold to local butchers. Investigation by the health department showed the statement to be unwarrantably misleading. The sheep were received, and were afflicted with a catarrhal disease, contracted probably by riding on cars in which they were exposed to the cold. The meat would be no more unhealthy to a mutton-eater than the flesh of a person suffering with a "cold in the head" to the delicate organization of a cannibal.

In closing the great international fisheries exhibition on October 31, the Prince of Wales stated, in a speech upon the success of the enterprise, that he hoped to see a hygienic exhibition held there in 1884.

The president of the board of health of New York city is vigorously pushing a sanitary inspection of schools.

"First aid to the wounded" is a branch of education which well supplements the good work now done by police patrols, which have attained such proficiency in some of our large cities. The St. Johns ambulance association of England has, by its instruction of policemen, firemen, and others, provided a large number of men who are able, in cases of emergency, to render very efficient, and often life-saving assistance to persons injured by accident, pending the arrival of more expert treatment from surgeons. It would be a good idea for the policemen of all the large cities to receive a course of lectures from their surgeons on the proper methods of resuscitating those apparently drowned, or suffocated, how to stop arterial bleeding, how to carry wounded persons on ambulances, and other knowledge contained in the manual of the St. Johns ambulance association. In the city of Chicago, to which city the credit is due of having introduced the admirable police patrol wagons, the education referred to has been liberally bestowed. A capable surgeon delivered a one-hour's lecture each day during the entire summer just passed, to the members of the patrol force, and they pride themselves upon their efficiency in giving the proper aid when they find an injured person. Each wagon contains a stretcher, a box of medicines and bandages.

The section on state medicine of the international medical congress to be held at Copenhagen, in 1884, will discuss fourteen questions touching upon the abuse of opium and alcohol, infant mortality, hygienic inspection of schools, disinfectants, the prevention of epidemics, etc. The secretary of the section is Dr. J. C. Lehmann.

Plumbers who claim to do sanitary work are occasionally criticised because the methods of plumbing which were considered sanitary five years ago would not now be accepted as best work. The criticism has been lately made that the ventilation of the soil pipe could then be accomplished by a small tube running up from the soil-pipe to the roof, while now it is necessary not only to have the soil-pipe continue full size through the roof, but the top should be enlarged, and an inlet provided at the base of the soil-pipe also. The criticism is not well founded. Plumbers are as anxious to do good work as their patrons, or the sanitary engineers, are to have them. The progression from old and faulty methods into new and better ones, should be hailed with gladness rather than criticized with bitterness. The only reason advanced by the critic was that, on account of the changing requirements of boards of health, a building plumbed in a faultless manner five years ago, will not pass an inspection by the health department now. This is not expected. Such requirements cannot be made retro-active; they apply only to houses in course of construction or alteration. In spite of dog-in-the-manger criticism, the evolution will go on, and good plumbers will be first to recognize a change for the better.

It may be stated, in this connection, that, through the influence of the master plumbers' association on the one hand and the authority of the health department on the other, the harvest of the disreputable or unskilled plumber in Chicago is, apparently, about over. It has been found very difficult, until recently, to secure the infliction of deserved penalty for defective plumbing, owing to the interference of politicians and others who seemed to have influence with courts and officials. A plumber on the West side was found to have connected a hopper water-closet, in the basement of a new residence on Ashland avenue, with the main drain by means of a wooden box, three or four feet in length. The upper end fitted up close around the closet, and the lower end was cut down sufficiently to admit of being thrust into the drain. The ordinance covering this defect, although somewhat indefinite, requires that water-closets shall be "provided with adequate, or the best generally approved, constructions and precautions for preventing gases and other offensive currents, substances and smells from passing up or out through such connection from such sewer or passage." The offender was find $10 and costs by Justice White, who also took occasion to administer a sharp reprimand.

With commendable frankness *The Mexican Financier* warns foreigners that, before they come to Mexico, they should be vaccinated, as small-pox is generally prevalent in the country. It is an encouraging sign when the press, instead of concealing the existence of a contagious disease, gives a note of warning, and informs the people how to avoid contracting the disease.

There is a growing demand among the plumbers for literature which will interest and instruct them. To interest them, were that the only problem, would be easily accomplished. To instruct them presents a question of greater difficulty. There are many plumbers, who are regular readers of this paper, who are in the front rank of their profession, and whose work serves as correct examples for others to follow under like conditions. When such men as these, who are already thoroughly instructed in their art, are still actively interested in the growth of sanitary science, it speaks well for the profession in general, and indicates a condition of the plumbers of which members of other professions might well take note. At the same time there are a few plumbers who are too easily betrayed into the idea that plumbing is all there is to sanitary science, and that a sanitary paper should devote itself entirely to the subject of plumbing. If the papers did this, the effort to stimulate alone the plumbing

branch of the growing sanitary tree would not only cause unsymmetrical growth, but endanger the life itself of plumbing, which is now so healthy and vigorous.

Koch is being rewarded in his investigations into the causes of cholera. He has found a peculiar and definite form of bacteria, which inhabit the walls of the intestines of patients dead from cholera. He does not yet say whether these are the cause of the disease, or the result of it.

The committee of the American public health association on vaccination presented, at the Detroit meeting, a long report urging compulsory vaccination. When the subject of protecting the people from small-pox by vaccination comes up, it is not the advisability of it that one doubts, but the best method to be adopted is uncertain. There are many who believe that it is unwise to make vaccination compulsory, because it will develop much opposition which is now latent, and many people will oppose it, not because they disbelieve in vaccination, but because of the interference with personal rights. Those who favor compulsory vaccination claim that there are no personal rights which are more sacred than the public welfare. They say that the state commits a man to the scaffold, depriving him of life itself, but it is done for the public good. The question is one for wise men still to discuss.

An esteemed homeopathic exchange recently said: "The state's care of the public health is not 'state medicine' any more than her guardianship of public morals is 'state religion,'" and urged the discontinuance of the term. The fact that preventive medicine is the only medicine which the state has any right to administer, is good enough reason for classifying efforts for the preservation of the public health, when carried on by governments, under the head of state medicine. Until our friend, *The Hahemannian Monthly*, suggests some better term than state medicine, let the words stand.

The outbreak of cholera in a suburb of Alexandria heretofore exempt is more full of danger than the first epidemic, although there are but few cases so far reported. The occurrence of the disease is attributed to the contamination of a stream running through the village, from corpses dead from cholera in a cemetery near by. It shows that disinfection was not severe enough to destroy the remaining germs of the disease. The present outbreak indicates that the disease is liable to recur next spring, unless extraordinary measures are taken to prevent it. If cholera were to remain in Egpyt but one year, the chances would be small that it would spread to this country if the modern methods of quarantine were strictly enforced. But if cholera is to be present in the delta of the Nile for two or three consecutive seasons, the chances that it will not reach Europe and America are very small. In view of the chances, our quarantines should be religiously kept. The disease is also reported to be present at Pekin.

Governmental health organizations can be assisted greatly in their work by the formation of voluntary health societies. One of the latest associations which have been organized is the Japanese society of health, of Tokio. Its objects are to spread the knowledge of hygiene and public health and to aid the sanitary efforts of the government, by discussing and determining the best means for maintaining and improving the health of the Japanese people, and for prolonging human life. A committee for investigations is provided, which shall study the following subjects: public and private health, school, prison, military, and naval hygiene, sanitary police, hygiene of occupations, hygiene of mind, medical science, pharmacy and materia medica, chemistry, protection of infant life, contagious diseases, statistics, sanitary legislation, fluctuation in price, demand and supply of commodities, civil engineering, industries, meteorology, geology and geography, natural history, charity, and cattle epidemics. From the list of subjects stated it will be seen that their line of investigation will lead them cutside the regular beaten track of previous sanitary study. The society is to have monthly meetings.

The Bower-Barff process for applying a film of magnetic oxide to cast-iron and steel surfaces, if it proves to be successful, and can be cheaply done, is of great interest to architects and plumbers. If architectural iron work may be made indestructible from the oxidizing processes now to be dreaded, iron will be much more freely used in building ornamentation than it is now. If, on account of this process, gas and water pipes may be made of much less weight and answer the purpose fully as well as heavier pipe, the use of such pipe will prove economical to plumbers. Pipe treated by the Bower-Barff process is at present being thoroughly tested as to its adaptability for house service pipes, and the result will be awaited with interest.

The extent to which sanitary science depends upon other sciences for its successful application is very striking when these sciences are mentally brought in review. Dr. Mapother's definition, so often quoted, states that sanitary science is "an application of the laws of physiology and pathology to the maintenance of the health and life of communities, by means of those agencies which are in common and constant use." This definition is a narrow one. If he had defined sanitary science as the application of those agencies which are in common and constant use to the maintenance of health and life of communities, he would have more nearly conformed to the present idea. There is scarcely a line of research, which is dignified by the term "science," which does not, in its application, bear upon the maintenance of the public health. On mathematics and its intelligent interpretation is based the safe construction of bridges, the correct proportion of conduits, the correct ventilation of auditoriums, etc. On the analytical capacity of chemistry, sanitary science depends for a knowledge of the purity of the ingesta. In the geological formation of the earth's structure is found the solution of many questions of water and heat supply. Mechanics, the science of the action of forces on bodies, the various divisions of physics, such as hydrostatics, pneumatics, acoustics, heat, light, electricity and meteorology, all have easily-recognized influences on the public health. Botany involves a study of fungoid growths thought by some to bear a causative relation to disease. Zoölogy delves into the life-history of germs. The study of the physical and mental sciences reveals inflexible laws providing punishments for their violation. A sanitarian should also be a scientist.

CHICAGO SEWERAGE—FLUSHING—XV.

The method of flushing the sewers of the city was partially described in The Sanitary News, in this series of articles, on page 76 of No. 19, Vol. 11. Two portable tanks are used, with a capacity of 239 and 280 cubic feet respectively. Although designed, primarily, to cleanse the smaller sewers—those of a diameter of two feet or less,—they are also found serviceable in cleaning the largest sewers. Although the volume of water discharged is not so great as would be the case if permanent, fixed flushing-tanks, at or below the surface of the ground, were employed, the present method is much more effective. It was proposed, originally, that the flushing be done by means of water pumped into large, underground, wooden pipes, or ducts. While these would have supplied a much greater volume of water, it became apparent that its scouring, or cleansing, efficiency would be lessened, if not almost entirely overcome, by the low grade of the sewers. It is evident that a given quantity of water driven through a sewer with force, under a head of several feet, will be more effectual than ten times as much running through a sewer which is nearly level, under a low pressure. The head afforded by the use of the portable tanks is from ten to sixteen feet, and the force of the current is sufficient to drive out sand and small stones, or blocks, which may find their way into the sewers. The use of the water mains for flushing found objection in the fact that if a large volume of water were forced through the sewers it would find its way back through house connections and flood cellars and back yards, unless valves were used; these, unless fixed, would be necessarily imperfect in action and would undoubtedly prove to be a nuisance in themselves by clogging drains to which they might be affixed.

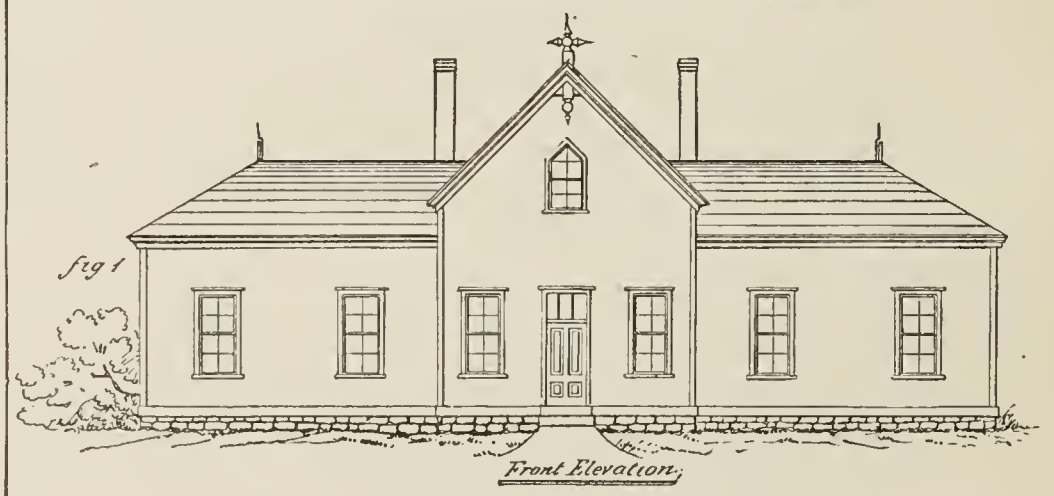
It is interesting to notice the difference in cost of cleaning the sewers in early years and at the present time. Flushing with the one portable tank in use in 1863 cost $1.63 per hundred feet of sewers; during the past year—1882—it was 81 cents. In 1863 deposits were removed from the main sewers by scrapers and barrows at a cost of $2.11 per hundred feet; the same process cost $7.06 in 1882. A chain machine was used in the former year for cleaning at a cost of $8.03, and the use of a wooden scraper in 1882 cost $1.24. The entire average cost in 1863 was $11.77 per hundred feet; in 1882, $9.11. The cleaning of catch-basins in 1863 cost only 90 cents each; in 1882, $1.68. There was a considerable reduction in the entire cost of cleaning the sewers in 1861 over that of the year previous, notwithstanding there was a considerable increase in the construction. This is referred to as indicating the effective use of the large portable flushing-tanks. "The cause of the reduction of the cost of cleansing the sewers," says Mr. Chesbrough, in his report for that year, "is partly owing to the more perfect removal of obstructions left in the sewers by unfaithful workmen, but still more to the efficiency of the new and large tank called Garibaldi. . . . By means of this tank, a small party of men and four horses, the smaller-sized brick sewers can be cleansed in less than one-third the time and one-half the cost required before. The pipe sewers were flushed before with a smaller tank, but the large one is much more efficient for them. Heavy deposits must still be taken from the larger-sized brick sewers by manual labor, but these can easily be entered by men with wheel-barrows."

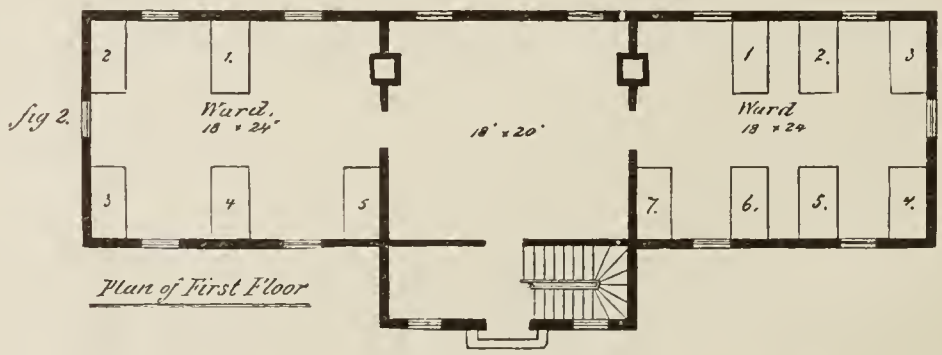
The cost of cleaning the sewers and catch-basins of the city is not a small item, the total for last year being $33,969.35.

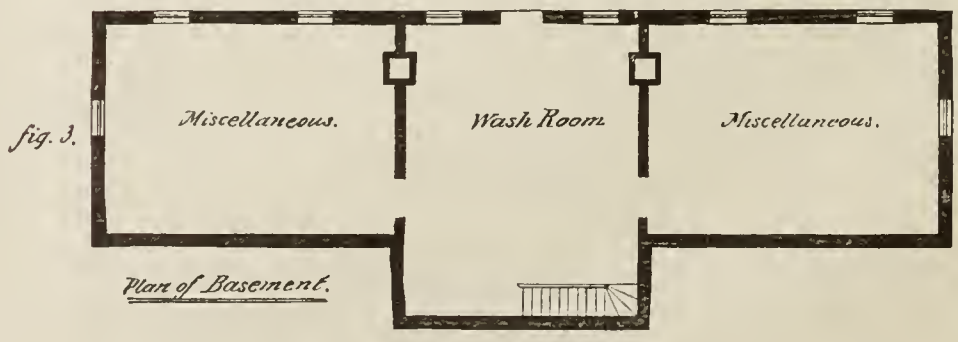
The extent of the sewerage of Chicago is shown in the following comparative table. Notwithstanding the fact that there are large districts of the city yet unsewered, and the city is fourth in population, it has more linear feet of sewers for each inhabitant than any of the leading cities named, Memphis, which has a special system, alone excepted. Chicago is now third in the list, as to population:

Plate I.

Proposed Plan for a Small-pox Hospital.



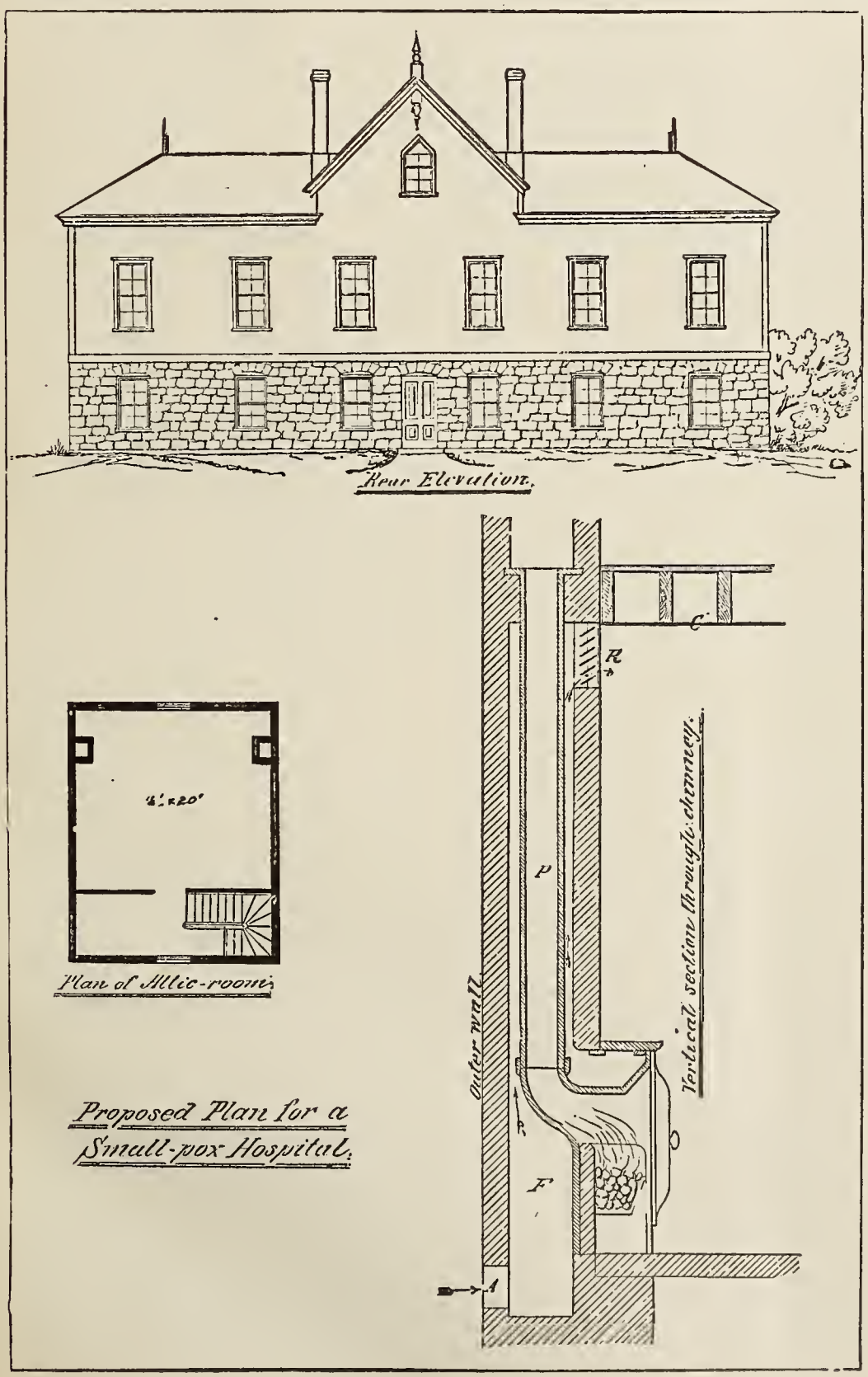




Cities.	Population by Census of 1880.....	Area in Acres.	Linear feet of Sewers in Use.....	Density of Population per Acre..	Square feet of Area per Capita.....	Linear feet of Sewers per Acre.....	Linear feet of Sewers per Capita...
New York..	1,206,299	26,401	2,086,082	45.69	953	7.901	1.73
Philadelphia-	847,190	82,803	1,082,400	10.23	4,258	13.07	1.28
Brooklyn ...	566,663	13,338	1,615,680	42.48	1,025	121.13	2.85
Chicago	503,185	22,797	1,912,765	22.07	1,974	83.90	3.80
Boston	362,839	4,416	1,099,913	82.16	530	249.07	3.03
St. Louis...	350,518	40,000	1,108,810	8.76	4,971	27.72	3.11
Baltimore ..	332,313	7,949	58,080	41.81	1,042	7.31	0.17
Cincinnati ..	255,139	15,360	351,120	16.61	2,622	22.86	1.38
San Fra'cisco	233,959	26,880	660,000	8.70	5,005	24.50	2.82
Cleveland...	160,146	17,165	449,698	9.33	4,669	26.19	2.81
Providence..	104,857	10,116	233,540	10.37	4,202	23.09	2.23
Memphis ...	33,592	2,300	184,400	14.61	2,983	80.17	5.49

A COTTAGE HOSPITAL.

In the last issue of THE SANITARY NEWS, an illustration was given of a portable tent hospital. Because of the interest manifested in the subject by several readers of the paper, illustrations of a more substantial structure for the treatment of contagious diseases, are given below. This hospital has been erected by the city of Davenport and the county of Scott, Iowa, conjointly. The plans were drawn by Dr. R. J. Farquharson, of Des Moines. The site chosen was a short distance from the large Mercy hospital, on a slight declivity, affording excellent facilities for drainage, and the additional advantage of having a well-lighted basement. After excavating, the site was tile-drained, and a drain of broken stone put just outside three sides of the foundation wall, which was of stone, the division walls in the basement being of brick. In inside measurements, the building is seventy feet long, twenty feet wide through the wings, and twenty-six feet through the central portion, the central projection affording a convenient hall containing stairways to the basement and attic. The superstructure is a wood-frame, with tarred paper underneath the weather-boards, the eaves being twelve feet from the ground in front, and twenty feet in the rear. It is twenty feet from the foundation wall to the ridge.



The two wards are each eighteen by twenty-four by ten feet in size, with five windows. There may be five or seven beds, and, in case of emergency, the number may be increased. The window area is about one-fifth the floor area in each of the two wards. The central room on the main floor is designed as a dining-room for attendants. The ground floor contains two rooms, eighteen feet by twenty-four feet, and one twenty feet by twenty-four feet. These rooms should be laid with concrete floors over drained surfaces. The central room will contain the kitchen and laundry appliances. The other rooms are designed for miscellaneous storage, dry-earth for the Wakefield earth-closets, which are supplied to the wards, and for the erection of a disinfecting oven. In the attic, there is a room, eighteen by twenty feet, in which two or three attendants may lodge. It is designed to ventilate the wards by the use of Galton or Jackson grates, and in case they do not heat sufficiently in cold weather, thimbles and pipe-holes are provided for stoves. The principle of the Galton grates is shown in plate II. The fresh air entering the cavity in the rear of the fire-back is warmed by contact with it and the smoke pipe, entering the room at the ceiling. In the Jackson grates, the warmed air is introduced into the room just below the mantel thus securing livelier circulation of the air of the room. If five persons occupied each ward, each person would have a cubic-air space of eight hundred feet, and a square surface of eighty-six square feet. In order to renew the air of the room each twelve minutes, the smoke-flue would need to have a sectional area of one hundred and forty square inches, and the fresh air flue would require a sectional area of four hundred square inches. The entire cost of this hospital, including all needed materials for furnishing, exclusive of site, was $2,500.

SOME SANITARY ASPECTS OF HOUSE CONSTRUCTION.—II.

BY WILLIAM WALLACE, PH. D., F. R. S. E., F. C. S., F. I. C.

It is a common observation that, in spite of every care being taken in the construction of a building, the joints of the stone are often imperfect and admit water freely, especially when the rain is accompanied, as it often is, by high wind, especially when the wind comes from the south-west. To prevent the rain penetrating, it is customary in some districts to build, not on a flat bed, but one sloping slightly upwards. This is a system highly to be commended; and if it be objected to on the ground of giving less stability to the building than working upon a perfectly level bed, this objection might be overcome by making the greater part of the bed level, with about two inches of the stone on the exterior side of the wall slightly bevelled.

In the case of rubble walls the best that can be done, probably, is to point them with a mixture of Portland cement, with twice its bulk of sand, taking care that the sand is not too fine; and then to whitewash the entire walls with Portland cement, a process which may be repeated with advantage. But the pointing should not be done until the walls have had a summer's sun and are practically dry; otherwise the greater part of the water in the walls will evaporate inwards, that is, into the house, and so keep the atmosphere damp for a longer time than is actually necessary. A two feet wall will not dry thoroughly, however, even under the most favorable circumstances, in less than two years.

As regards the interior of houses, plaster, whether on brick or lath, is exceedingly porous, and permits of a ready diffusion of gases; and a wall merely whitewashed or colored with distemper is better in a sanitary point of view than one that is covered with oil paint, which becomes by this process practically impervious to the passage of gases. Wall-papers are probably not so bad in this respect as oil paint, but are certainly inferior to distemper or whitewash.

The foundation of a house and the basement are the most important parts of it as regards its sanitary condition. The most perfect foundation upon which a house can be built is a solid platform of concrete, extending over the entire area of the building, and from two to three feet in thickness, according to the height of the walls, and coated over on the top with nearly pure cement. No damp could penetrate this mass; but I would not, even in this case, lay the sleeper joists upon the concrete, but would place them at a sufficient height to obtain ventilation of the space below the floor. In case of accident, arising from the bursting of water-pipes, or other causes, I would make the concrete with a slight upward slope towards the center of the area, so that water could run away freely through the ventilating gratings. This would be a somewhat expensive foundation, but I think it would be a most satisfactory one. Another system which would probably prove equally good is to build the foundation walls and dwarf walls up to a certain level, fill in the interior spaces with broken material *to the same level*, and cover the whole surface with a layer of Portland cement with two parts coarse and three inches thick. Another system still is to place a damp course of slate, or slatey stone, bedded in Portland cement, on the whole of the walls; fill up the whole foundation to the same level with broken material, and cover this, but not the walls, with asphalte. This makes excellent foundation, but the filling in is generally omitted, the architect being content with a damp course on the walls just below the sleeper joists, and levelling the interior space and asphalting. In this way I have seen very serious evil resulting from the absorption of water from the soil by the portion of the walls below the damp course, then giving off sufficient watery vapor to keep the space below the floor quite damp and to introduce dry-rot to a most alarming extent. It is not an uncommon practice to neglect the precaution of putting a damp course on dwarf walls, in which case dry-rot is almost certain to occur unless there is profuse ventilation. In such a case the joists should be laid not in a wall-plate of wood, but upon roofing slates placed below each joist, but it is better to place along the top of the dwarf walls a complete anti-damp course of roofing slates bedded in cement, and upon this to lay a wall plate in the usual manner.

With regard to the ventilation of the space below the basement floor, it is a safe rule to have gratings all round the building, if it is a detached house, not more than ten feet apart; but if it is a street where ventilation can be obtained only in front and back, the gratings should be not more than five or six feet apart, and should be of ample size, say ten inches by six. In order to facilitate the free circulation of air, the dwarf walls and partition walls should have numerous and large openings. It may be objected to that such ample ventilation as I have indicated would make a cold basement story; but the simple remedy is to put ashes, with or without lime, below the floor, in the same way that deafening is applied to the upper floors.

In a wet climate, such as ours, in which it is not an uncommon occurrence to have half an inch of rain falling in a single day, it is a proper thing to cover the chimney-tops in order to prevent rain from coming down and keeping the gable walls to some extent constantly damp, and it is a good thing to combine with the cover a means of preventing down-draught in the chimneys during high winds. The cover which I recommend is one having a flat top with a section of a cane below, the whole chimney top and cover being constructed of galvanized iron. The chimney is ten inches diameter at the bottom, and eight inches at the top, the cover is twelve inches diameter, and the space between the top of the chimney and the cover is four inches. The cover is supported on three iron rods, and is fixed by nuts in the top, which are easily removed when the chimney is to be swept. All chimneys should be lined with fire-brick cylinders very carefully jointed, otherwise a great deal of watery vapor from the combination of the coal will find its way into the gable walls, and there may be trouble also from smoke. A chimney from a gas stove, unless kept open below, is certain to give trouble from the condensation of water. Every cubic foot of coal gas gives by combustion about an ounce of water, and as gas stoves consume from ten to thirty cubic feet per hour, a very large quantity of water is produced. In ordinary coal fires the large proportion of heat wasted up the chimney prevents any considerable condensation of water unless when a fire is just lighted, but in the case of gas-stoves the heat passing up the chimney is comparatively small, and is probably never sufficient to prevent entirely the condensation of water.

In this brief sketch I have taken up only one branch of my subject, and I do not propose to deal with others, such as the ventilation of dwelling-houses and public buildings; but I shall merely notice, in conclusion, an exceedingly simple means of ventilating apartments, which I have found to give excellent results. It is to put in every window in a house a series of perpendicular holes, one inch in diameter, in the lower frame of the top sash of the windows. The holes may vary in number from three to six, according to the breadth of the window, and I may say that I have not found it necessary, even during the prevalence of the highest wind, or during the coldest weather to close any of these orifices.

I fear I owe a humble apology to the architects who are members of this congress for going beyond my own profession and invading theirs, but I trust that my remarks may be accepted in the same spirit in which they have been given. I have endeavored to put together a few hints founded on my own observation and experience; and if some of my ideas are not new, as I can well believe, they may not be the worse for being enforced by repetition.

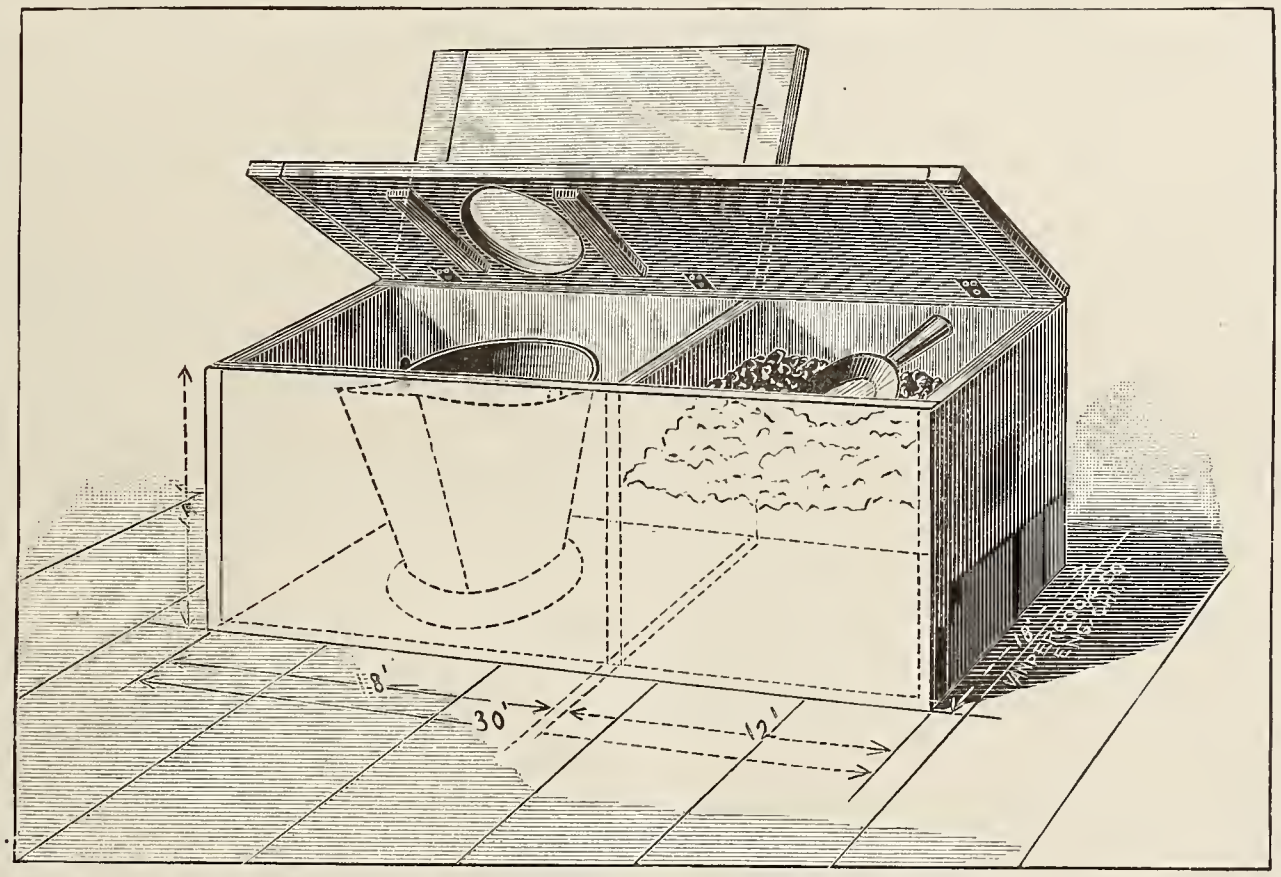
THE SEWAGE FARM AT OXFORD, ENGLAND.

This farm consists of three hundred and thirty acres, of which sixty-four acres are permanent pasture, two hundred and twenty-six acres arable, twenty-eight acres are filter-beds, and twelve acres are taken up by buildings, roads, etc. Two-thirds of the land is light and sandy, but, near streams, a deposit of peat overlies the clay. The other third is stiff soil varying from marl to dense clay. The land had to be underdrained, the tiles being laid from six inches to three feet deep, from twenty-two to sixty-six feet apart, and, in size, being from two inches to fifteen inches in diameter. The filter-beds are drained by pipes thirty-three feet apart. In excavating for drains, an ancient cemetery was encountered in dangerous proximity to the well. The surface of the farm is irregular, and with the exception of the filter-beds, it was not leveled. The sewage is conducted from the distributing pipes by concrete sluices, the flow being so regulated as to fall in a thin sheet over the sides of the sluices along their whole length. The beds are laid on a gradual slope, with furrows at right angles to the slope. The quantity of sewage delivered on the farm daily is 1,430,865 gallons. The yearly quantity received per acre is 1,657,986 gallons, which is equivalent to an annual rainfall of 73.2 inches. The net profit from cropping the farm for two years past was £545.

CHEAP AND CONVENIENT EARTH-CLOSETS.

To the Editor of the Sanitary News:—In reply to your favor of recent date, asking me to give my experience in the construction and use of earth-closets, I have pleasure in sending you this note on the subject. I think it will be found to cover all the points likely to be of practical interest.

When water-closets cannot be made available, the earth-closet will be found of the greatest convenience and benefit. In addition to the well-known dangers attending the neglected accumulation in privy-vaults, I know of few things more destructive of health and comfort than dependence upon one of these dreadful out-buildings. A visit to one of them involves an amount of exposure in cold weather which even strong men have reason to dread. In the case of women, children and invalids, I can think of few things worse than a plunge out of doors in cold or stormy weather, usually without the precaution of extra clothing, or overshoes, for a visit to the foul shrine of Cloacina. The neglect of regular attention to the calls of nature, which the dread of this exposure induces, tends to encourage women and children in disregarding them as long as possible until the evils inevitably attendent upon the habit of constipation, much too prevalent in this country, are induced and confirmed. The head of a family who makes no better provision than an out-door privy for the needs of his household, neglects the most obvious, as well as the most selfish of his sanitary duties.



It was a necessity resulting from the temporary occupancy of a country house without "modern conveniences," that led me to experiment with earth-closets, and I am glad of an opportunity to give others similarly situated the benefit of what I have learned. I first consulted the advertisements and bought an apparatus costing about $35. It was a neat piece of cabinet-work, highly recommended, but not quite practical. The deodorizing material was contained in a reservoir above and behind the seat, and, after use, the movement of a lever was supposed to discharge into the pail a fixed quantity of this material. Its automatic character was the principal objection to it. Sometimes the material would hang suspended in the reservoir, and had to be jarred down before the discharging apparatus would work. But the principal difficulty was that it was seldom thrown where it was most needed, and that the dust was inconveniently deposited on the seat. I then set about to make one which should not be automatic, and I have never since been without one or more of this pattern. The accompanying sketch requires but brief explanation:

The body is a plain pine box. Its sides are not over 14 inches high; its depth is 18 inches (measuring from front to back), and its length about 30 inches. It is divided into two compartments, one 18x18 inches, and the other 18x12 inches. The larger of these compartments has no bottom; the smaller has a tight bottom. On top I have two covers. The lower cover, hinged to the upper edge of the back, extends all the way across both compartments. In this is cut the seat, of usual pattern, over the center of the larger compartment. The upper cover is hinged to the lower one, and may be raised independently. It is made the size of the larger compartment only,—both covers having a little overhang to facilitate lifting them. The material in, and work on, such a box will cost anywhere from $2.00 to $3.00, according to the amount of finish put on it by the carpenter.

The receiving vessel is a galvanized-iron coal hod, as large as will stand in the larger compartment with the covers down. The smaller compartment is filled with dry earth, ashes, peat-dust, or whatever else is used as deodorizer, and a little hand-shovel, or scoop, is laid in. The closet is then ready for use, which should be preceded by thowing into the coal-hod as much of the dry material as is needed to cover its bottom an inch deep. When used, the upper cover is raised, exposing the seat. After use the lower cover is also raised, uncovering both compartments. A small quantity of the dry material is then taken in the scoop and sprinkled over the contents of the hod. A quart is usually more than sufficient. This operation is repeated whenever the closet is used, until the hod is full, when, of course, it must be emptied. Its contents will turn out as a solid mass, inoffensive to sight and smell. Even the most fastidious person, with strength enough to carry the full hod out of doors, would make no objection to emptying it. Occasionally, it is well to air and sun the hod after emptying. I have never known one to require other cleansing. It is better not to use an earth-closet as a urinal, but so much of such use as is incidental to its employment as a stool in no respect interferes with its satisfactory workings. In my own house, I have placed no restrictions whatever upon its use for any purpose for which any one with sense would consider it adapted. The only time I ever had trouble with it was when a new servant, mistaking it for a water-closet, overflowed the hod with the contents of a large, chamber-maid's pail of wash water from the bed-rooms. I then had some rather unpleasant mud to dispose of.

The best of the materials for use in an earth-closet which can be had, without expense or trouble, is the fine siftings of anthracite coal ashes. Ashes from bituminous coal are not adapted to the purpose. Dry, loamy earth, or leaf-mold, will answer very well, but it is troublesome to dry and store it. It cannot be had dry enough out of doors, even in mid-summer. Sand is useless.

Discreetly and decently used, an earth-closet gives very little trouble. If ashes are thrown in after each use, it will not require any attention until the receiving vessel is full. My earth-closet was once, by accident, put to a crucial test. Having occasion to leave home somewhat suddenly, I locked my house and took my family with me. After starting on my journey, I remembered that the earth-closet receiver was nearly full, and that I had forgotten to have it emptied. Speculation as to the condition in which I should find it on my return home caused me no little uneasiness. I could not do anything about it however. After an absence of about three weeks, during the hottest part of the summer, I returned home, to find everything as I had left it and notwithstanding the fact that the earth-closet had been locked up in a close room, not a trace of disagreeable odor could be detected. Whether earth would have done as well as ashes under these circumstances, I am not able to say. The object of leaving the larger compartment bottomless, is to facilitate cleaning. More or less ashes will be spilled around the hod, and this should be swept out frequently. By raising one end of the box, the floor under it can be swept much cleaner than the bottom of a box could be without turning it over.

Such an earth-closet as I have described can be placed and used anywhere indoors. I have no doubt it could be made a nuisance, especially if boys were permitted to saturate the wood with urine, if a person using it should forget to use ashes, or if the hod were left to become overfull and matter intended to be held in it should roll off on the floor. It needs attention like every other good thing, but given as much care as would be bestowed upon any other article of furniture, it meets all the requirements of a safe and convenient indoor commode.

J. C. Bayles.

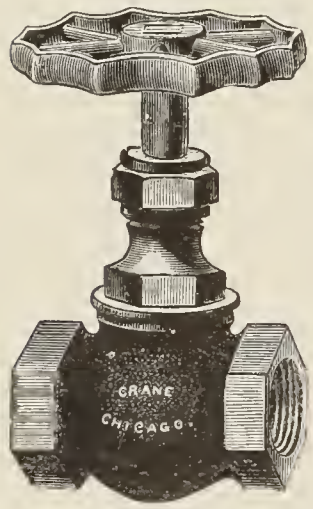
83 Reade street, New York, Oct 4, 1883.

THE MANUFACTURE OF SANITARY APPLIANCES—I.

BRASS FITTINGS.

The plumber, the gas-fitter, and the steam-fitter, as well as the general reading public, will be interested in a description of the processes of the manufacture of the articles of brass, lead, and iron, which enter so largely into the proper arrangement of the water-,steam-,and gas-supplies of cities and individual buildings. It is proposed, in a series of articles, to describe briefly the processes employed in the manufacture of brass-fittings, cast and malleable iron fittings, wrought-iron pipe, and lead pipe. The information on which these descriptions will be based is gained from a personal inspection of the largest manufacturing houses in this country. A visit to the establishment of the Crane Brothers' Manufacturing Company, supplied the facts on which this article is based.

The composition of the metal known as brass is an alloy of copper, tin, zinc and lead, in varying quantities. The color of the brass indicates roughly the amount of copper entering into its composition, the lighter yellows indicating a larger proportion of tin or zinc. The metals to be made into brass are fused together in a pot placed in a furnace of hard coal. This pot is then lifted out and the molten metal poured into moulds in which it is cast. The casting of a brass globe valve, of the kind usually employed on steam-heating radiators, and shown in the accompanying cut, will be taken as an example. The cores, corresponding to the air-space on the inside of the valve, are made by girls. Sand, of great adhesiveness, is used for cores, the quality varying according to the size of the cores. The moulds for the cores are made of iron, and open in halves by a hinge at one side. The sand, first having been well mixed with resin, is forced into the mould as solidly as possible. A few taps on the mould with a mallet loosens the core; the iron mould is carefully opened and the core placed upon a rack. The cores are then put into a steam-heated oven, having a temperature of 270° F., in which they are baked. When thoroughly baked, the cores are stored away for use. The cores for iron fittings are made in the same manner. The mould in which the cast is to be made requires much skill in its preparation. It is made in two boxes of moistened sand, by means of a pattern embedded one-half in each box, from which it is carefully lifted. In the depression, the exact size of one-half of the valve, is placed the core, the other half of the mould then being placed over it The molten brass poured into the mould, fills the interstices between the core and the mould. The heat from the metal burns the resin in the core, thus freeing the sand, which, when the cast is cool, is easily shaken out, and used again. The rimming out, cutting threads, and polishing are all accomplished by machinery, ingeniously contrived, mostly automatic in its action. Brass bibs and cocks, elbows, tees, crosses, reducers, bushings, couplings, return bends, unions, and nipples are all made substantially as described. The finishing of brass castings is a work requiring care and precision. The softness of the metal and the ease with which it may be spoiled require the most careful manipulation. The use of brass for valves, cocks, etc., is almost universal.



WATER-CLOSETS.—III.

A. J. Roubo describes a water-closet, and also gives several views to illustrate the subject in the great French book on joiners' work (L'Art Menuisier), published in 1770. We think these are the earliest illustrations of a water-closet extant. The bowl is cut from a single block of stone, all the inside lines being curves so it will not retain the filth as readily, and be easier to clean than if it were in another shape. The

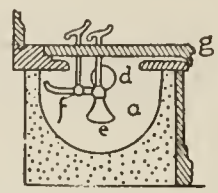


Fig. 17.—Cross-Section.

a, Bowl. *c*, Waste with plunger removed. *e*, Supply. *f*, Bidet-attachment. *d*, Overflow.

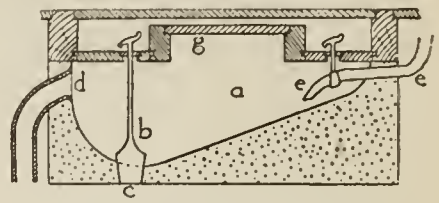


Fig. 18.—Section of Closet.

Without bidet attachment, and different arrangement of seat. *a*, *c*, *d*, *e*, *f*, Same as Fig. 17. *b*, Plunger. *g*, Seat cover.

lead supply pipe has T-shaped handles and a nozzle spread into the form of a fan, which is evidently for spreading the water over a larger surface of the bowl than would be the case if the nozzle was of the same shape as the pipe. The above-mentioned closet is one of the simplest forms of plunger-closets, and if we are determined to use a closet of this class, then the simpler style would be better and more cleanly than those which have concealed and foul compartments in which the plunger works, and of which only experts have cognizance. In this closet we see a branch from the supply-pipe which could have been used only as a bidet-attachment. This has a hinge-joint so it can be folded back under the seat when not in use. The wood-work is carefully mitred, being tongued and grooved wherever it is advantageous, as is shown by the details. A lid covers the seat, and is made to fit as nearly air-tight as possible when it is closed. The closet described was called "a closet with a plug" (*Lieux desoupapes*), and it was in use in France a long time before it was in England, as the author informs us.

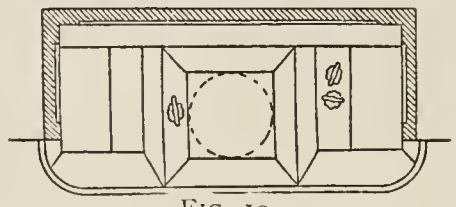


Fig. 19.
View of seat showing mitres and joints

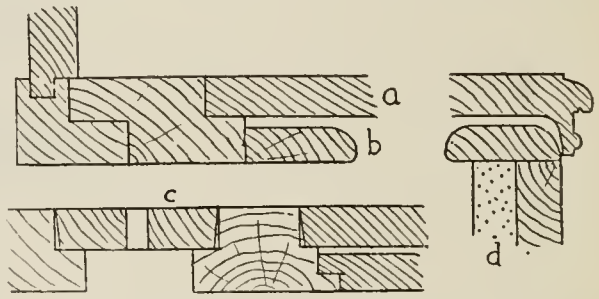


Fig. 20.—Details of joiners' work.

a, Cover. *b*, Seat. *d* Bowl (stone). *c*, Opening for plunger and cock handles.

The first English patent for a water-closet was issued in 1775, A. D., to Alexander Cummings, a watch-maker in Bond street. This closet has a sliding valve, or slider, as it is called, between the trap and bowl, and is the only patent issued with a horizontal sliding valve. The title being "a water-closet upon a new construction,' proves the use—we might say the common use—of water-closets during and before this time, but of a different pattern from Cummings' closet. Here we find the first recorded instance of a siphon trap being used under and in connection with a

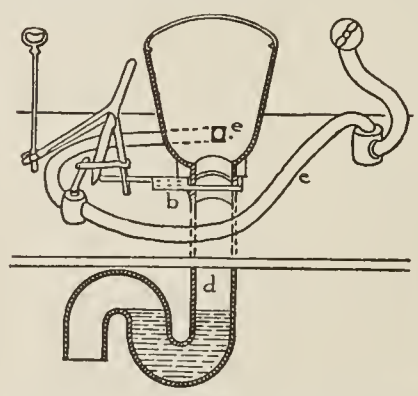


Fig. 21.—Cummings' Closet.

a, Bowl. *b*, Slider, or valve. *d*, Siphon-trap.

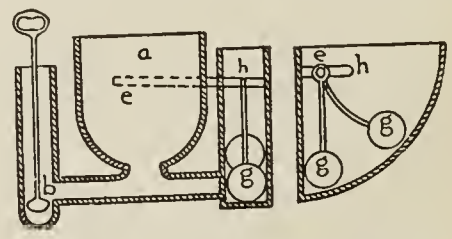


Fig. 22,—Prosser's Closet.

a, Bowl. *b*, Plunger. *h*, Chamber for ball cock. *g*, Balls for cock. *e*, Supply.

water-closet, although we have evidence of siphons having been used in the time of the Egyptians. Below are quoted a few extracts from Cummings' specifications: "The advantages of the said water-closet depend upon the shape of the pan or bason [bowl], the manner of admitting water into it [near the bottom], and on having the stink-trap hitherto used for water-closets so constructed that its contents shall or may be totally emptied every time the closet is used. . . . The stink-trap hitherto used for water is too well known to require a description here; and although it may serve effectually to cut off all communication of smell from the drains, pipe and cesspool, it becomes in itself a magazine of fetid matter, which emits an offensive smell every time it is disturbed by using the closet. In this water-closet the pipe which carries off the soil and

water is recurved about twelve or eighteen inches below the pan or bason [bowl], so as constantly to retain a quantity of water sufficient to cut off all communication of smell from below, and this stagnated water in the recurved part of the pipe is totally emptied and succeeded by fresh every time the pan or bason is emptied. . . . The horizontal sections are circular, or nearly so." The mechanism is very clearly shown in the drawing which accompanies the specification. If the siphon-trap fulfills the duties specified, and we think it does, why complicate matters with the "slider?"

The next patent was issued in 1777 to Samuel Prosser, a plumber living in the parish of Martin-in-the-fields, for a plunger-closet with a double-ball-cock for shutting off the water when it had risen to a certain height in the bowl, and for turning on the water-supply when it had fallen below a definite point. Here we see, for the first time, the (as we consider it) pernicious practice of placing the plunger and ball-cocks in compartments separated from the bowl, as far as the sight can penetrate, but connected as far as the deposits from the water and filth are concerned. This closet is described in the specifications as "a water-closet upon an entirely new construction, which will always remain free from any offensive smell." We, at the present time, know too well the folly of such claims. Wherever concealed chambers exist connected directly with the bowl, there filth and decayed matter will accumulate, and will become not only offensive to our olfactory nerves, but hurtful to our health. The excreta, in finely divided particles, in this and all similar cases, has free access to compartments that can never be cleaned without the assistance of an expert mechanic.

WATER-CLOSETS IN ITALY.

To the Editors:—In the interesting paper on Water-Closets in your number for October 15, occurs the following statement on the authority of Petronius: "That in ancient Italy it was considered desirable to have in close proximity the place for the preparation of food and the receptacle for the excreta." How customs not the "fittest" survive, and how just such a state of things exist in modern times my experience shows. In 1849 while traveling, by malle-poste, from Rome to Florence, a stop was made for breakfast at a hotel in a small town. Inquiring for a water-closet, we were led by a servant, to a privy-seat in the open kitchen, not many feet distant from several women preparing food.

Des Moines, Ia., Oct. 22. 1883. R. J. F.

THE NAVAL MUSEUM OF HYGIENE AT WASHINGTON.

The advantage which would accrue to the cause of public health by the establishment of a national museum of hygiene has long been felt by American sanitarians. In England, the Parkes' museum of hygiene has had an existence for several years, but it is only within the past year that it has been allowed to become national in its character. This country owes it to the surgeon general of the navy that it has, at its capitol, a museum for the reception and exhibition of articles and publications which shall illustrate the entire field of sanitation in this and other countries. The existence of the museum was provided for by a clause in the appropriation bill for 1882–3, and will doubtless be similarly provided for in the future. The surgeon general requests contributions of articles, appliances, models, drawings, etc., illustrating improvements in food, water-supply, bedding, clothing, marine architecture, house and hospital construction and furniture; apparatus for heating, illuminating, ventilation, and removal of excreta and refuse; culinary, laundry, and bath facilities; appliances for physical culture and exercise; and whatever else tends to the preservation of health and the prevention of disease. The exhibits are properly credited by descriptive labels to the persons contributing them. The library has over five thousand bound volumes of foreign and domestic sanitary works, and over one hundred current periodicals devoted to hygiene, science and medicine. The American public health association has made the museum its permanent repository. At present, there are two hundred and sixty-four exhibits. The museum is in charge of J. M. Browne, medical director of the U. S. navy. The following classification of exhibits will prove interesting as showing the extent of the museum, and also as a guide for the classification of sanitary libraries:

DEPARTMENT OF PUBLIC HEALTH AND COMFORT.

CLASS I.—LOCAL HYGIENE.

Sub-class 1.—SOIL: *a*. Geological and physical character of localities. *b*. Thermality. *c*, Permeability by gases and water. *d*. Micro-organisms.

Sub-class 2.—ATMOSPHERE: *a*. Chemical composition. *b*. Abnormal constituents—chemical, microscopical. *c*. Physical properties—humidity, heat, electricity, winds, weight.

Sub-class 3.—ARCHITECTURE: *a*. Dwellings. *b*. Hospitals, medical establishments, infirmaries, asylums, homes, alms-houses. *c*. Buildings for educational purposes, refuges, reformatories. *d*. Schools of all degrees, and their equipment. *e*. Factories, laboratories, (chemical, powder, fire-works,) metallurgic works, work-shops. *f*. Vaults, morgues, mortuaries, burial of the dead, and cremation. *g*, Movable dwellings, tents, shelters. *h*. Materials of construction, devices. *i*. Walls, prevention of the rise of damp through foundations and walls, *k*. Cellars, surface drainage. *l*. Wood floors for use without carpets. *m*. Fire-proof construction. *n*. Ventilation, *o*. Heating; grates, stoves, furnaces, steam, hot water. *p*. Fixtures and fittings connected with water-supply. *q*. Drainage; disposal of refuse and excreta. *r*. Defective and ill-constructed traps, pipes, and sanitary apparatus of various kinds. *s*. Materials and appliances for obtaining artificial light. *t*. Laundry arrangements, *u*. Floor, wall, and ceiling coverings; tiles. *v*. Household furniture, showing sanitary advantages and defects. *w*. Fabrics suited to avoid the harboring of dust, zymotic effluvia, or vermin. *x*. Culinary utensils and other household requisites from a hygienic standpoint.

Sub-class 4.—TOWNS AND CITIES: *a*. Streets, roads, parks, etc.; paving. *b*. Drainage and sewerage. *c*. Application of sewage to agriculture. *d*. Water-supply, public baths and laundries; drinking fountains. *e*. Public lighting. *f*. Food-supply, markets, dairies, slaughter-houses, hotels, restaurants. *g*. Steam, electric, and horse railroads. *h*. Water transportation.

Sub-class 5.—SHIPS—WAR, MERCHANT, YACHTS: *a*. Heating and ventilating. *b*. Living accommodations *c*. Quarters for the sick.

CLASS II.—PERSONAL HYGIENE.

Sub-class 6.—CLOTHING: To include materials, processes, and fabrics. *a*. Specimens of fabrics used for clothing, with statements of their relative power of resistance to the absorption or transmission of heat, their relative flexibility, durability, fast or fugitive color, etc. *b*. Body garments providing against cold, rain, dry or damp heat, dust, and attacks of insects. *c*. India rubber, gutta-percha, and other waterproofs. *d*. Head and foot coverings. *e*. Military, naval, and industrial costumes.

Sub-class 7.—FOOD: *a*. Food supplied by the animal kingdom. *b*. Food supplied by the vegetable kingdom. *c*. Secreted and extracted products. *d*. Condiments. *e*. Narcotics and masticatories. *f*. Beverages and drinks. *g*. Microscopic preparations illustrative of genuine and adulterated food articles. *h*. Culinary science and dietetics. *i*. Military and naval rations. *k*. Personal regimen—exercise. *l*. Special hygiene of professional occupations.

DEPARTMENT OF LIFE-SAVING AND PRESERVING.

Sub-class 8.—PUBLIC HYGIENE: *a*. Life-saving from fire. *b*. Protection against lightning. *c*. Protection against inundations. *d*. Protection against explosions. *e*. Protection against accidents in submarine works. *f*. Protection against accidents in mines. *g*. Safety appliances in traveling on land. *h*. Safety appliances in traveling on water. *i*. Prevention of the accidents, injuries, and diseases incident to industrial employment. *k*. Prevention of contagious diseases. *l*. Attendance to persons wounded in war—ambulances, cots, litters, and other apparatus. *m*. Attendance to persons accidentally injured in peaceful pursuits. *n*. Fragments of exploded boilers, heaters, tubes, etc., damaged by pressure, frost, acids, scales, and other deposits.

DEPARTMENT OF LITERATURE AND DRAWINGS.

Works of reference, pamphlets, reports, etc., pertaining to the foregoing classification; views, plans, designs, maps, charts, illustrations, etc.

SANITARY LAW.

LATE DECISIONS.

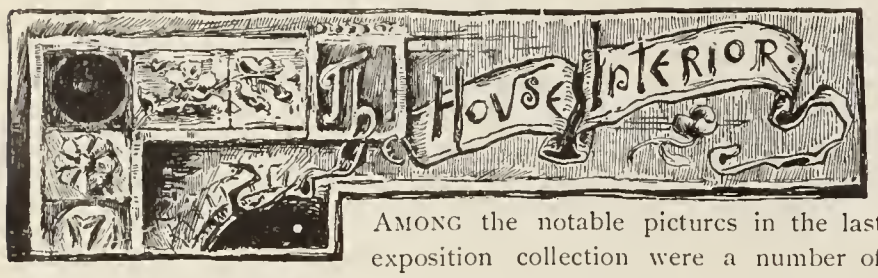
Court of special sessions of New York City. Action brought under Food and Drug Adulteration law of 1881, for the sale of impure cream of tartar. A small fine imposed. Appeal taken, conviction reversed; the court holding that the defendent proved that he had bought the cream of tartar sold by himself, from a dealer in the open market, who had assured him that it was of the best quality and commanded the highest price, and that he had sold it as represented. No criminal intent or negligence established.

Supreme Court of New York. City of Rochester defendent in an action for damages resulting to plaintiff by reason of sewage poured into a stream which flowed through his land, the water of which he furnished to his cattle. The court gave him a verdict for damages. The judge decided that the plaintiff has a right to say that nobody shall increase the natural flow, nor can he be compelled to take any more drainage than flows by reason of the natural shape of the land, nor can the people above him turn anything into the stream which would not naturally flow there if left to its ordinary course. They cannot increase the area drained, the amount of the drainage, or send down into the stream any waters or things that would not naturally flow there.

Circuit Court of Ingham Co., Michigan. Catharine Reusch, plaintiff, *vs* City of Lansing, defendent and appellant. Mrs. Reusch maintained a hog-pen, after the board of health had declared it a nuisance dangerous to the public health, and ordered its abatement. Mrs. Reusch paid no attention to the order, and the city marshall, by order of the board of health, destroyed the pen. Mrs. Reusch sued the city in justice court, and secured a judgement of $23.50 and $10 costs. The city ap-

pealed the case, and a verdict was rendered in its favor. Judge Gridley, in his charge, said that the board of health had the power under the charter and city ordinance to declare the pen a nuisance, and to abate it by removal, provided it was a nuisance in fact, and dangerous to the public health.

Monmouth County Court, N. J. Board of Health *vs* T. Hyer, defendent. Hyer charged with assaulting a health inspector who was inspecting his property. Judge Walling charged the jury that the board of health had no right to appoint an inspector, and no authority to make an inspection of any man's premises, except in cases where a complaint had been made, and that after the complaint had been properly made, the inspection must be made by a majority of the members of the board. Verdict of acquittal rendered for defendent.



Among the notable pictures in the last exposition collection were a number of works by American painters in Paris, most of which were exhibited in the recent French Salon. The careful and artistic framing of these pictures furnishes an important suggestion. Many people give no thought to the frames which they order for their pictures, except that they shall be of the latest fashion. The idea that a picture can be materially helped or hurt by its frame has never entered their minds. While there are certain fashions in frames, they are not so unyielding that a picture need ever be injured by its setting. For oil paintings, flat and receding frames in the various metallic colorings are most in use. Bronze enters into the composition of almost every wide frame and is combined with dull or burnished gold, steel, copper or black. Simpler frames are used for aquarelles, those of hard wood being sometimes preferred. A well chosen mat is a valuable aid to an aquarelle, and one of gold or bronze may often be used with excellent effect. A flat, silver frame, if suitably used, is very satisfactory. Plush is much in demand as an inside border to metal frames, but there is always danger in its use of making the frame more prominent than the picture it encloses. A $30 frame for a $3 picture was an order recently executed by a framer, and that part of the work which should have been wholly subordinate was so aggressively emphatic that one forgot all about the poor overshadowed picture. Etchings, engravings and works in black and white generally have narrow, unobtrusive frames of hardwood. Oak and cherry have been quite popular and have largely replaced ebony. A new moulding of Hungarian ash, which is about the color of chestnut, beautifully marked with irregular, wavy lines of a darker color, is very desirable. Some wood frames show delicate carving and some are inlaid with metal. Picture mouldings are wider and more elaborate than heretofore and have the same metallic combinations shown in the frames. Narrower mouldings are usually of the same wood as the finishings of the room. Where wide mouldings are employed each picture is hung by two brass chains.

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The heated rooms and closed windows and doors which the cold weather necessitates greatly augment the dangers to health from sewer-gas and insufficient ventilation. A grate fire is one of the best possible ventilators and should be employed where it is possible, especially in bedrooms, which need only a moderate heat. The standing objection to an open fire that it needs frequent replenishment, that it is dusty and will collect unsightly ashes, should not weigh for an instant against the advantages of its healthfulness and cheerful comfort. Every room in use in a house should be thoroughly aired every day, and sunlight should be freely admitted. If people realized the health-giving power of sunshine there would be fewer invalids crouching over registers, and shivering behind dark curtains, and more unobstructed windows where one could sit in the warmth and glow of an invigorating sun bath. In houses where there are thick carpets and heavy draperies to absorb and retain the dust, the greatest care should be taken in winter to keep them well aired and cleaned. Rugs that can be easily taken up and hangings fastened on their rings by pins can be often taken out of doors and shaken, and are far better than carpets closely tacked down and curtains nailed up so that they can be removed only once or twice a year.

Many articles, both useful and ornamental for artistic furnishing, are shown this season in burnished brass, and where the wall and furniture of a room are dark or dull in color, they serve an excellent purpose in lighting and relieving the prevailing monotony. Sconces and small mirrors in frames of beaten brass effectively brighten a shadowy wall space where a picture could not be hung. A fender and coal-scuttle of the same bright metal are very satisfactory fire-place accessories, adding to the cheer of the glowing fire, and being also substantial and appropriate for the uses to which they are put. Small drawing-room tables are made entirely of brass with tops of porphyry. There are a number of excellent designs in these tables. Some brass screens with bevelled mirrors in swinging frames show quite elaborate work, and serve the double purpose of looking-glass and screen, which makes them especially appropriate for an elegantly appointed bedroom or dressing room. Bands and tips of brass and claw feet are used on many of the new tables and chairs.

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A new mantel cover of golden brown silk serge has a scarf covering the shelf and hanging over each end half way to the floor. These ends are embroidered with Japanese roses in shaded yellows. Across the fronts of the mantel is a straight lambrequin gathered up very short at each corner of the shelf and fastened to the scarf with a large bow of wide gold-colored ribbon. Across the center of this lambrequin is a spray of the yellow roses. A wall banner of myrtle-green serge is ornamented with branches of lilacs, in crewel and ribbon work, the fine close blossoms being effectively simulated. The most serviceable bureau scarfs are of linen canvas, the ends finished with elaborate drawn work and knotted fringe.

Martha Howe-Davidson.

SANITARY INSPECTION OF LODGING HOUSES IN PARIS.

The municipal council of Paris has recently created a special inspection service for rented and furnished lodgings. This service consists of five regular and four assistant inspectors, and is under the supervision of the prefect of police. Its duty is to report on the salubrity of lodging houses. The salary of the regular inspectors is fixed at 3,000 francs and expenses, which are fixed by the council. The assistant inspectors are to receive a monthly stipend of 125 francs. Every inspector, or assistant, will be required to furnish, in such form as may be designated by the proper bureau, and within forty-eight hours, a special report upon each lodging house that he shall have been called upon to inspect. In cases of disagreement, the second inspection shall be made by architects selected from the special force of architects, to whom shall be allowed expenses of examination at a rate fixed by the council.

THE CHICAGO MASTER PLUMBERS.

The regular semi-monthly meeting of the Chicago master plumbers association was held on the evening of Nov. 7, Vice-President Boyd presiding, in the absence of President Young.

A communication was received from Dr. Oscar C. De Wolf, commissioner of health, in which he accepted an invitation to deliver a lecture before the association. Dewitt C. Cregier, commissioner of public works, in a communication, complimented the association for the work it was doing, and expressed his sympathy with it. He regretted that he would be unable to accept the invitation to speak before the association.

Mr. John Denniston, of No. 148 North Clark street, was elected a member of the association.

Mr. Henry C. Meyer, editor of *The Sanitary Engineer*, who was present at the meeting, was invited to address the members. He expressed himself as much pleased with the Chicago association ; it seemed to have a clear idea of the scope of such an organization ; its attention to the apprenticeship question and co-operation with the city health department were alluded to as evidences of this. He was pleased to see that the association was aiming to let the outside community know something about plumbing,—to impress the public with the idea that the plumber has much to do toward protecting the health and lives of the people. The idea incorrectly prevailed that there was something secret about the business of the plumber. By its open meetings and public discussions the association was doing much to dispel this idea.

Mr. Boyd read the report of the committee on the constitution and by-laws of the national association, and the committee was authorized to have the report printed and circulated among the members of the local association for suggestions as to amendments.

Mr. Henry L. Gay, architect, addressed the association with reference to a proposed permanent exhibit of building materials in this city. He outlined his plan, which was to open extensive rooms in a central portion of the city, in which should be exhibited everything relating to the construction of a building, from the brick used to decorative material. Space would be furnished for any legitimate article in this line, which would be set up and put in working order, and attendants would explain everything to the public who would be admitted free of charge. Mr. Gay had learned that the master plumbers' association contemplated putting on exhibition certain articles which had been donated, and he desired to have the encouragement and co-operation of the association.

Mr. A. W. Murray read a "historical sketch" relating to early Chicago plumbing and sewerage, prepared by President Young, who had been detained at home by illness. Mr. Young said that twenty-nine years ago the water-works of this city were located at the foot of Randolph street. The pipes extended south as far as Twelfth street, those on Edina and Buffalo streets, now Third and Fourth avenues, being of logs. The usual size of a pipe to supply the out-door hydrant of a dwelling was half an inch, and that could be strong or light as the owner preferred. On the west side of the river the pipes extended to Halsted street. At that time there was no sewerage system, each building sewers to suit himself. The usual method was to extend a wooden box sewer to the street, and terminate it in an empty hogshead underground. "The sanitary engineer and sewer-gas had not yet made their appearance." The closet then in use was the pan closet with oval bowl and a good cistern. The soil-pipe was made of "honest lead" and "as the contract system had not come into vogue the work was honestly done." The cock in use at that time was of the ground-in pattern. The boilers were of copper and made in the alley just south of the Tremont house, by Wolff & Maguire. The copper was of good quality ; the steel boiler had not yet come into use. All manufactured articles for plumbers at that time were of good quality, and the work was well done. The plumbing shops were those of John Hughes, Alexander Raffen, Captain Lawson and R. D. McFarlane.

As the ground on which Chicago stood was spongy, the entire force of a shop was turned out when a tap was to be made ; the job done, the employer discharged the men for the day. The journeyman was trusted and treated like a gentleman. He was a first-rate workman, as well as an open-hearted man. His money and sympathy were freely tendered a brother out of work, or laid up by sickness. Their favorite resort at that time was at the corner of Clark and Madison streets, where they gathered evenings and Sundays, and, using the floor for a blackboard, lay out runs of soil-pipe, showing how the work was done and how it should be done,—"in fact," said Mr. Young, "more sanitary science was explained and argued than has been written upon from that day to this. These very discussions sharpened the interest taken in their calling. This is the reason that the journeyman of that time was master of his trade. The apprenticeship was five years ; and there are quite a number among us who served that time. The boy was proud of his boss and of his shop, and was ready to maintain the honor of his shop, under any and all circumstances,—by force of arms, if necessary. It was also a matter of pride with the bosses that their boys should turn out well, and when together they would do a little bragging themselves."

Mr. Young thought there had not been much improvement since. To the best of his recollection for a period of twenty years there was not a single death or case of sickness from sewer-gas, "which speaks volumes," he thought, "for the unpatented system of that time."

THE MEMPHIS SEWERAGE SYSTEM ABROAD.

In an interesting letter on "Sanitary works at home and abroad," in *The American*, by J. G. R. [ichardson, M. D. ?], the following interesting extracts relate to the adoption of the Memphis system of sewerage, in foreign and domestic cities: In Paris, "by a vote of twenty-two to six, the commission of experts recommended that Col. Waring's system should be introduced as an independent experiment; and for this purpose one of the flattest and most difficult districts of the city, that of the Rue Vielle du Temple, in La Marais, has been chosen, and here the work is about to begin. It is to be done by a drainage company of which Col. Waring is the engineer and M. Pontzon the executive officer in charge. * * * While, however, the matter was under discussion in Paris, the engineers from other European cities followed the subject up, and already a plan for the sewerage of the new part of Rome on Col. Waring's system has been approved by Vescovali, the chief engineer of the city, and work will soon be begun there. In Naples, local engineers have made plans for its introduction. Trieste has handed over to Col. Waring all the plans hitherto prepared for the sewerage of that city, and he is engaged on their revision in accordance with his system. In St. Petersburg, an association of leading citizens have united in requesting Col. Waring to make a plan for the sewerage of that city, and it will be submitted to the city government this year. Numerous American cities are taking the same path. Keene, N. H., Wilkesbarre, Pa., Pittsfield and Lenox, Mass., Pullman, Ill., Kalamazoo, Mich., Omaha, Neb., Little Rock, Ark., Birmingham, Ala., and Norfolk, Va., have all set to work to introduce Col. Waring's system. New Orleans has voted to adopt it, and is only waiting for some way out of its financial straits to begin work."

PARIS WATER-SUPPLY.

According to a recent work by M. Eug. Péligot, spring water, even if calcareous, is vastly superior to river water for drinking purposes, especially when the latter has flowed through cities. In Paris, the waters of the Dhuis and the Vanne are much superior to the water of the Seine for drinking and domestic uses. The Seine water is sometimes disagreeable on account of the presence of organic matters, and it is moreover to be feared that, by reason of the germs it transports, the river is in certain cases a dominant cause of the deterioration of the public health. Now that Paris is sufficiently supplied with spring water, abstinence from drinking the water of the Seine ought to be among the first preventive measures advised in time of an epidemic.

DIPHTHERIA AND FAULTY PLUMBING.

Dr. Chamberlain, secretary of the Connecticut state board of health, in a report just published, states that "the persistency of diphtheria, which is so clearly a filth disease, so far as its local causation in Hartford has been traced, appears to be due to the want of traps under house fixtures, faulty plumbing, unventilated house drains and unventilated sewers. The need of an ordinance to fix a sanitary standard, at least for all new tenement houses, is being emphasized every season. Diphtheria does not thus persist without a cause. If there could be an ordinance passed compelling all house drains to be ventilated, it would improve the sanitary condition of the city greatly, but if this be too radical a step the future at least can be guarded by proper provisions for all new buildings."

CURRENT PUBLICATIONS.

BUTLER'S PHYSICIAN'S POCKET RECORD.

This book is issued for its eighteenth year, by *The Medical and Surgical Reporter*, of Philadelphia. It contains many useful tables and reference memoranda of great use to the active practitioner.

BUILDING.

The first special illustrated edition of *Building*, bearing the date of October 1, consists of the regular edition of the journal, to which is added nineteen selections from the standard foreign architectural decorative and furniture journals. It is published at 50 cents a single copy, or $5 a year. The illustrations are very artistic.

VAN NOSTRAND'S ENGINEERING MAGAZINE.

The number for November contains, among other valuable articles, one on the Bower-Barff process for rendering iron rust-proof, by A. S. Bower, C. E., and one on the Water-Supply of San Francisco from Lake Merced, by P. J. Flynn, in which he states that the supply is totally inadequate, and to be kept pure would necessitate the prevention of the extension of the city over its watershed.

PUBLICATIONS RECEIVED.

"Hygienische Tagesfragen I. Die Kanalgase deren hygienische Bedeutung und technische Behandlung, Von Dr. Friedrich Renk, mit 25 Abbildungen. München. 1882, M. Rieger'sche Universitäts—Buchhandlung, (Gustav Himmer.)

"The Peoria Medical Monthly." A Practitioner's Journal. Vol. IV. October, 1883. No. 6. Peoria, Ill.

"China. Imperial Maritime Customs. II.—Special Series:" No. 2 Medical Reports, for the Half-Year ended 30th September, 1882, 24th issue. Published by Order of the Inspector General of Customs. Shanghai; Statistical Department of the Inspectorate General. Pam. pp. 46.

"Transactions of the New Hampshire Medical Society at its Ninety-Third Annual Session, held at Concord, June 19 and 20, 1883." Concord, N. H. Republican Press Asstn. 1883. Pam. pp. 187.

"Changes in New England Population." By Nathan Allen, M. D., LL. D. Together with an Explanation and Defence of it. Pam. pp. 16.

NOTES AND NEWS.

ANNOUNCEMENTS.

Nov. 27. Baltimore, Md. Sanitary Convention under the auspices of the State Board of Health.

Dec. 5. Chicago, Ill. Regular meeting of Local Master Plumbers' Association.

Dec. 6. At Indianapolis. Regular meeting Indiana State Board of Health.

Dec. 13 and 14. At Ionia, Michigan. Sanitary Convention under the auspices of the State Board of Health.

Jan. 1. 1884. At Nashville, Tenn. Regular meeting of the State Board of Health.

Jan. 8. Lansing, Mich. Regular meeting of the State Board of Health.

PLUMBING NOTES.

Fleeming Jenkin, of Edinburgh, recently said that in testing the drains in a house, he applied the paraffin test. No smell was found in the house, but in another house, on the opposite side of the street, the inhabitants were very much annoyed by the unaccountable paraffin odor which suddenly pervaded their house.

Under the new law in San Francisco, sixty-nine persons have registered as master plumbers, and ninety-nine as journeyman plumbers.

A bill to regulate the business of plumbing was lately introduced into the house of delegates of St. Louis.

The first meeting of the Cincinnati master plumbers' association was held on the evening of October 2; the meetings are held regularly on the first Tuesday evening of each month.

WATER-SUPPLY.

Water-works are being constructed at Catskill, N. Y., St. Cloud, Minn., Lynn, Mass., (extension) Wiers, N. H., (new reservoir) and Parsons, Kan.

The water-supply of San Francisco is to be increased by a new reservoir to be built by the Spring Valley company.

The Omaha water-supply system is about completed. There are two subsiding reservoirs of 11,000,000 gallons capacity, into which the Missouri river water is pumped by two Andrews' centrifugal pumps having a capacity of 30,000 gallons a minute. Two Knowles' compound duplex pumps, of 6,500,000 gallons a day, force the water from the subsiding reservoirs to the storage reservoir. The work is under the direction of Harry Berkinbine, C. E.

BIDS AND CONTRACTS.

Dallas, Texas; sewers in Third and Fourth wards; construction awarded to Fight and Son, for $30,000.

St. Paul, Minn., for grading Dakota avenue and Goffe street, McCarthy and Farrell are to receive $24,920.

Kansas City, Mo.; for sheet copper, tinned on both sides, for the government building. The Ansonia Company of New York are to receive 22 cents a pound.

The contract for paving and curbing Wentworth avenue in the town of Lake, from Fifty-fifth to Sixty-ninth streets, was awarded on Oct. 31 to D. Stevens, for $3.15 per lineal foot. The contract for the sewer in the same avenue, from Thirty-ninth to Root streets, was awarded to Kelly and Burns, at $1.94 a foot.

SEWERAGE.

The London Lancet describes a new system for ventilating sewers in which gas is introduced into the man-holes and burned in Bunsen burners under fire-clay plates. The plates, one above the other, form a channel through which the air from the sewer passes on its way to the open street above. Being submitted to a temperature from 600° to 700° F., all germ life in the air is thoroughly destroyed.

The nuisance caused by the stagnation of sewage at the mouth of the Powell street sewer in San Francisco is at last in the courts, measures being instituted to determine whether the Meiggs Wharf company, owners of abutting property, are amenable to law.

ARCHITECTURAL NOTES.

M. E. Bell, of Des Moines, Iowa, has been appointed supervising architect of the Treasury.

Benj. S. Rotch, of Boston, has created a scholarship in architectural study, consisting of two years study abroad for two persons. It is limited to Massachusetts students.

Mr. George Godwin has retired from the editorship of *Building*, (England), a position he has ably filled for more than thirty years.

HEATING AND LIGHTING.

The Edison and the Swan electric companies in England have amalgamated under the name of the Edison and Swan United.

The Edison electric light has been introduced on the new passenger steamer Pateena of the Tasmanian Steam Navigation Company's line.

SANITARY SOCIETIES.

Signor Mancini, Italian minister of foreign affairs, will soon address a circular to other powers, relative to a conference at Rome to draw up an international sanitary code.

BOARDS OF HEALTH.

A bill to establish a state board of health for Maine passed the second reading at the last legislative session, but it was defeated in its last reading.

Dr. N. D. Baker, of Martinsburg, formerly member of the board of directors of the asylum for the blind and deaf of West Virginia, has exchanged positions with Dr. Geo. N. Carpenter, of the state board of health.

VITAL STATISTICS.

In the first six months of 1883 there were 987 more deaths than births in Madrid. In the kingdom of Spain, there were 192,227 deaths, and 236,127 births. Of the deaths, 45,958 were caused by communicable diseases.

The monthly death-rate for Milwaukee for September was equal to 21.8 in one thousand population in one year.

PREVENTABLE DISEASES.

The German cholera commission have gone from Egypt to India to continue their investigations.

Yellow fever at Brewton, Ala., is accompanied with an unusually high rate of mortality.

Dr. Sternberg, who has had large experience with yellow fever, advises that the sick be not removed except in the very earliest stages, but that the well be removed at once from the infected locality.

Charles Lorensen, a farmer near Elgin, Ill., died Oct. 26 from glanders contracted four weeks previously from a horse sick with an unrecognized disease. Mrs. Lorensen is also sick with the disease.

There has been a genuine scare in Saxony, because of the rapidly increasing number of cases of trichiniasis. The origin, however, does not seem to be traced to American pork.

A severe epidemic of typhoid fever has been prevailing among the pupils of the St. John's German Parochial school of Adrian, Mich. Dr. Lyster, a member of the state board of health, has investigated the outbreak and attributes the cause to a well located in the yard, the soil being saturated with fecal filth. There have been several deaths and over twenty cases.

MISCELLANEOUS.

A correspondent states that by melting butterine in a saucer, and then placing the dish on ice, the lard will separate from the butter and appear in a white rim around the butter.

Hygiene is now included in the curriculum of the science and art department at South Kensington, England.

Plans for the addition to the main building of the Michigan reform school at Lansing, designed by architect Grosvenor, of Jackson, were examined by the state board of health last month.

The following is from a recent official circular in relation to the medical corps of the U. S. Army: "Few candidates pay the attention to hygiene which it deserves; it is always made a subject of this examination, and will be considered *a vital one in the examination for promotion after the expiration of five years' service.*

Thuillier will have a monument at Alexandria.

As the political complexion of the Ohio legislature has changed from republican to democratic, the advocates of sanitary reform in Ohio are in hopes of securing a state board of health law.

Dr. Angus Smith says: "Let us keep our rooms so that the air gives no precipitate or milkiness when a ten and one-half ounce bottle full of air is shaken with half-an-ounce of clear lime water."

The death-rate of Grand Rapids, Michigan reached the phenomenally low figure of 5.16 per 1,000 per annum, for the month of October.

A homeopathic diphtheria hospital has been ordered by the Czar of Russia.

PROCEEDINGS

OF THE

AMERICAN

Public Health Association.

[*From* THE SANITARY NEWS *Special Representative.*]

TUESDAY'S PROCEEDINGS.

THE OPENING.

The eleventh annual meeting of the American public health association was held in Merrill hall Detroit, Mich., this week. The first session was opened on Tuesday morning, Nov. 13, Dr. Ezra M. Hunt presiding; a large number of members were present. The early portion of the session was devoted to the reports of the secretary and treasurer, election of members, report of the committee on cattle diseases, etc.

TEXAS CATTLE FEVER.

D. E. Salmon, V. S., read a paper on Texas eattle fever, in which he stated that the disease known by that name was present constantly in several of the southern states, is infectious, and that one mode of its spread, at least, is through pastures and infective excreta of affected cattle, and that the disease might be carried in this way among cattle to distant states. He stated that the Texas cattle, on their native ranges, were almost invariably afflicted with the fever. If northern cattle were to be saved from this contagious disease, a quarantine must be declared against Texas cattle. Among the thousands of cases in the north, there was not one which could not be traced to cattle from that state.

The paper was discussed by Dr. Regan, of Texas, and others.

ACTINOMYCOSIS.

An important report was presented upon a disease of cattle—actinomycosis,—the result of an investigation made by William T. Belfield, M. D., at the request of the commissioner of health of Chicago. This is the first examination into this disease which has been made in this country. Five animals were examined. The peculiarities of the disease are rough hides and emaciated bodies, and tumors on the face, connected with the jaws. The swelling consists of a tough cartilaginous substance, firmly attached to the bone, both being filled with pus cavities. The tumors are caused by a microscopic plant, which is supposed to gain entrance to the jaw through defective teeth, or by growing down between the teeth and the gum. The disease also invades the human species, and is contagious. It is quite prevalent among Western cattle, and the meat is dangerous to use as food. Two varieties of the plant are known in Germany. Dr. Belfield has not determined whether this is a variety different from them or not.

Prof. James Law stated that the disease has been met with before in America; that it has been successfully treated by scraping clean the affected portion of the bone and applying iodine; and that it has been found in dogs as well as the animals mentioned by Dr. Belfield.

MALARIA.

The second session—Tuesday afternoon,—was opened by the reading of a long paper by Surgeon George M. Sternberg, U. S. A., on the etiology of malaria, in which, after reviewing the present state of investigations concerning malaria, he gave statistics compiled from reports from the surgeons in charge of army posts stationed along the Atlantic coast, from Eastport to Key West, on the Mississippi river, and in Arizona. These statistics gave the latitude of the post, the number of cases of intermittent fever, the ratios of cases to each one thousand soldiers, the annual mean temperature, and the annual rainfall. He stated that the disease had become to be recognized as of telluric origin. The statistics showed that malarial diseases prevailed more extensively in warm than in cold climates, and in warm than in cold seasons of the year. Yet heat, though an important, was not the only causative factor. As a rule, stations in the interior had more malarial disease than seaboard stations of the same latitudes. He considered moisture to be an essential factor in the causation of malarial diseases. In the southern department of Texas and Arizona, the mortality was three times as great among white as among colored troops.

The next paper was on the etiological association of organic matter with malaria, by Surgeon Alfred A. Woodhull, U. S. army, which was read by Dr. A. L. Gihon. In this paper the importance of stagnant soil water, and changes in its level and temperature as connected with malarial diseases, was touched upon. Ground-water, near the surface of the ground, seemed to be more favorable to the development of ague than ground-water of a deeper level.

The discussion on these papers was opened by Dr. A. N. Bell, of New York, who thought gaseous emanations from putrefactive organic matter would produce malaria. It would not cross a very broad stream, because he thought the water absorbed the malaria passing along its surface.

Dr. George H. Rohè, of Baltimore, called attention to the fact that decomposition went on to a greater degree, and the cause of malaria was more frequently produced, when the swamps were drying out than when they were full.

Dr. Hillary Ryan, of Caldwell, Texas, had observed that malarial fevers were very prevalent on deep sand and on the banks of millponds. He said there were emanations from deep sand which caused malarial diseases.

Dr. Charles H. Smart, of the U. S. army, then read a paper on the prevention of malarial diseases, in which his argument was based on the supposition that the malarial agent was introduced into the system by water. He believed that surface water was usually the vehicle. Filtration of drinking water was suggested as a means of preventing the disease.

HOG CHOLERA.

Dr. J. M. Partridge, of South Bend, Ind., read a report on hog cholera, giving its history. He stated that it was a disease sui generis, having distinct pathological characteristics in all localities. He described the bacillus suis, claimed to have been discovered by Detmars. The infectious principle may be introduced into the system by food or drink, or through cuts or abrasions. As preventive measures all cuts or bruises should be kept closed by applications of tar, or some substance impervious to air or water; water should be pure, and cars clean, and carbolic acid in doses of ten drops to each one hundred weight of the animals may be fed to the hogs, three times per day. The sick hogs should be removed from the well, or destroyed. Separate the well into small herds, and remove them to fresh pastures.

TREASURER'S REPORT.

Dr. J. Berrien Lindsley, in his report as treasurer, stated that the receipts for the year had been $4,257.23, and the disbursements $2,928.98.

There were twenty-two members elected to membership at the forenoon session, and fifteen at the evening session.

ADDRESSES OF WELCOME.

The evening session was devoted mainly to addresses of welcome by the Governor of Michigan, Josiah W. Begole; by Dr. William Brodie, of Detroit; and by Dr. John Avery, of Greenville, on behalf of the Michigan state board of health. In the address of the governor, he made the statement in considering the humanitarian character of the members of the association, many of them being physicians, that when he should see a convention of lawyers, assembled to consider means of doing away with litigation, he should consider the millenium as near at hand. He paid a well-deserved compliment to the Michigan state board of health for its efficient work, and said that the day would come when the sanitary worker, in saving life, would receive more honor than the soldier who destroys life. In the address of Dr. Brodie, the practice of laying lateral sewers in the alleys which traverse each block was described. Dr. Avery stated that no phase of medical progress indicated such growth as the work of this association. He stated that, at the present time, millions were paid to drive out disease, but thousands only for preventing its invasion. True economy is shown in treating disease as any dangerous enemy is treated. He illustrated the advance of sanitary law in twenty-six states. He also alluded to the maintenance of sanitary publications, and the interest manifested by the newspaper press in health matters, as a satisfactory indication of sanitary progress.

THE ANNUAL ADDRESS

of President Hunt was happily introduced by a eulogistic tribute to the state of Michigan as the banner state of health effort. He then described the organization of the association at Long Branch eleven years ago, and its growth from year to year. He described how the famous passion play of Oberammergau had its origin as a measure of penance because of a pestilence imported into the village. The remaining portion of his address

was devoted to an analysis of the science and art of sanitation. In speaking of the lines of work which a sanitarian could follow, he stated that one could be an original investigator, a collector and sifter of existing knowledge, or a practitioner of known sanitary rules and laws.

At the close of the president's address the members of the association were invited to the Russell House, where a banquet had been spread, and a pleasant *conversazione* was held in the parlors.

WEDNESDAY'S PROCEEDINGS.

MISCELLANEOUS PAPERS AND DISCUSSIONS.

On Wednesday morning, after the election of several members, the paper on observations on Texas cattle etc., by Surgeon Jos. R. Smith, U. S. Army, was read by title.

The next paper was on the changes in type of malarial fever in Sumter County, Ala., by Dr. R. D. Webb, of Livingstone, Ala., which was read for him by Dr. D. C. English, of New Jersey.

This paper was followed by a discussion on malaria, introduced by some interrogatories on causes of malarial fever, by Dr. J. W. Penn, of Humboldt, Tenn., and a short paper on the clinical thermometer in the prevention of malarial disease.

Col. George E. Waring, C. E., secretary of the national board of health, stated that in England, where malaria had previously existed, agricultural drainage, by which the ground-water level was lowered about two and a half feet, prevented malaria. A conspicuous case, which would bear on malaria, would be the filling of the Potomac flats at Washington. He did not believe that the swamps had any causative relation to Washington malaria, but thought it was caused by a marsh extending from the Kebble bottom to the capital. He then referred to the Berkshire, or New Lennox, malarial trial, and thought it not fair to say the result of the trial proved the swamp theory a fallacious one. The result of the trial had no sanitary value, on account of the manner in which the case was prosecuted.

Dr. Gustavus Devron then spoke of the influence of the swamps surrounding New Orleans as malarial producers.

Dr. O. W. Wight, of Detroit, called attention to Pettenkofer's investigations on ground-water as a cause of malaria, and asked that all states urge and carry forward drainage as a preventive of malaria.

Dr. William Oldright, of Toronto, spoke of the views of Dr. Bray, of Ontario, on causes of malaria in winter when the ground was frozen, believing that the cause of the disease, being carried under the houses in ground-air or water, rose up in the house in vapor.

Dr. Trescott, of Greenville, S. C., spoke on the fevers of his locality. Dr. M. Tormonto, of New Orleans, Dr. E. L. Griffin, of Chicago, Dr. V. C. Vaughan, of Ann Arbor, and Dr. P. H. Bryce, also, discussed this question.

The next paper was on the sanitary control of the food supply, by Dr. W. K. Newton, of Paterson, N. J. This was a long resume of the existing laws of English-speaking peoples, providing for the prevention of the adulteration of food.

VITAL STATISTICS AS SANITARY MONITORS.

The next paper was read by Albert L. Gihon, A. M., M. D., Medical Director U. S. navy, first vice president of the American public health association, on the subject given above. The following is the paper in full:

This is eminently a statistical age. To command attention, a measure must now-a-day be supported on adamantine columns of figures. Whether this be because of an incredulity that suspects a veneered sham in every new thing and sees only unquestionable fact in unquestionable figures, or because the domain of law is now recognized in all the petty, as in the mighty, doings of the universe and its minor parts, and numerical results are regarded as the measures of the operations of that law, it is undoubtedly true that the advocate to-day argues in vain unless he has the substantial basis of figures on which to establish his position.

Naturally, hobbyists and enthusiasts, who build on fallacy, are tempted to distort the plastic numerals, boldly causing them to skip over decimal points until the wily multiplication and division is not observed or turn somersaults until 6 reads 9 or 9 becomes 6, and the all-important summaries, aggregates, totals and grand totals look you in the face as demurely and as briefly as the nine wise virgins. Figures can not lie, it is said. Actively, and of their own accord, no; but skillful manipulators can put them through a set of Punch-and-Judy performances that will deceive the closest observer.

A second class of figure-builders pile up their mounds like so many huge scrap-heaps with no intention of fraud and no definite idea of their purpose, but with a vague thought that they may some day be of use to somebody for something. These industrious compilers, like the computers of such ingenious problems as the accumulations of a penny invested at compound interest at the birth of Christ, exhibit a marvelous industry but as regretable a waste of time and misdirected energy. When their results are made the basis of abstruse calculation, and formulæ are evolved in which fractions, roots and surds are piled up in bewildering complexity, with big letters and little letters covering almost the whole alphabet, Roman and Greek, to show what might be if something else were, we wander from that practical field in which the sanitarian should delve into the region of arithmetical romance.

The statistical investigations bearing upon vital questions are those which have especial interest for the sanitarian, and while these are only beginning to be formulated, it behooves us to guard against methods that will result in the mere accumulation of masses of figures that can have no practical value, or a value foreign to the objects of sanitary science.

The vital statistics that have thus far most engaged attention have been limited to records of the number of births, marriages and deaths in communities, and a classification of the immediate causes of death. Unquestionably, the amount of annual accession to a population by births and its loss by death are important chapters in its history, as interesting to the sanitarian as to the political economist; but it may be doubted whether the number of marriages contracted are of especial moment outside of the domain of social science and moral philosophy. It can scarcely be claimed that they are, in this profligate age, any measure of sexual relations, which, of course, are of paramount importance to the hygienist. The age of nubility in the two sexes, that of the menopause and of the cessation of virility, the length of life of celibates, and the married, and those who, though not legally wedded, have been practically conjugate, are of vital moment. The mere report of the number of marriage ceremonials solemnized by clergymen and magistrates does not concern us.

Human beings come into the world all in pretty much the same condition. The helpless, puling infant has tendencies, manifest enough if to the red hair and snub nose of its elated father, but whether to phthisis, rheumatism or syphilis, as undiscoverable as the yet unfolded brain which is to determine him a genius or a devil. Hence, for statistical purposes it is enough to know that so many are born, unless we can get accurate data as to their parental health history; but it is not enough for the sanitarian to know merely how many die, since comparatively few human candles, however fairly lighted at the top, burn down to the very end before they go out, and even when the causes of their premature extinction are accurately recorded, this is not a correct exponent of the amount of physical impairment, which it is the mission of sanitary science to seek to remedy.

Vital statistics, to have the highest sanitary value, must embrace an accurate record of the sum of disease movement in a community, and especially of its recognizable causes. Statistical tables that show how many are born and how many die are interesting, but tables that show how many are sick and why they are sick, though it be not unto death, are sanitary monitors which the most reckless liver would not dare disregard, nor the most incredulous scoffer at science dare butt his own numbskull against. Hence, my only purpose to-day is to call attention to the necessity, while we are providing for the tabulation of the vital statistics of our people, to do something more than collect birth, death, and marriage lists, and carefully to scrutinize the morbid phenomena that are in play around us. On a former occasion I demonstrated that the mortality rate was no evidence of the degree of health determination of a population. In the city of my residence, Washington, only seventy-seven died from malarial diseases and forty-four from typho-malarial during the year ended 31st of July, 1832. Does any one imagine that these numbers indicate the real extent of influence of that peculiar and mysterious source of physical discomfort, disability, and disease, which afflicts the dwellers on the shores of the Potomac and other of our Atlantic estuaries? The druggists' returns of the quantity of quinine sold would be a more exact index. There were nine deaths from syphilis during the same period, but even the society for the prevention of licensed prostitution, with its marvelous facility for getting the largest returns from the smallest capital of figures, could scarcely harlequin this into proof that

unlicensed prostitution has a sanitary character to which the legitimate tax-paying commodity could not aspire. There were one hundred and twenty-three deaths from typhoid fever, but the plumber's dreams would be of a rosy heaven, with no avenging devils threatening to take him to a hotter place, if this accounted for all the bad drainage, defective sewerage, and criminal incompetence, which bring so many mortal careers to an untimely end. Advance in therapeutic art may lower the rate of mortality, while there may be no diminution in the number of recruits to the ranks of the sick through the unsanitary sinnings which it is an especial office to abate.

Vital statistics properly comprise the tabulated record of whatever affects the life of man,—its beginning and its ending, and all the storms that disturb the smooth surface of the wide ocean that lies between them.

It is easy enough to say what ought to be done; the task is more difficult to prescribe how it shall be done. If he who grapples that mad bull, medical ethics, by the horns, literally has his hands full, and is fortunate if he is not gored and tossed outside the arena, what shall be his fate, who would undertake to intrude upon the sanctity of the physician's visiting-list and say to him: "Tell me how many sick people you have and what is the matter with them?" Under such a despotism, what would avail the breathless messenger, who rushes into church while the collect of the day is being read, and before the other collect is taken up, or the recital of so many cures of diabetes, or so many perinœal and ovarian sections with uniform success, which now beguile the monthly society meetings? Can meager official sick returns support the high salaries with which admiring friends have endowed us, even with a reputation for penury that atones for their visible manifestations? Would five cases of scarlatina account for fifty boasted of, or as many reported labors explain the sleep supposed to have been lost night after night for weeks.

The sanitary scientist, in the interest of the public health, has a right to know the exact degree of health pollution; but how is it to be gotten at? Certainly not by voluntary contributions, but by legislative requirements, and just as the census taker, armed by the law requiring returns of age, etc., is deceived alike by spinster and addlepated dude and ancient fop, so would the young aspirant in medicine, as well as the old pretender, multiply and magnify his catarrhs and croups and diarrhœas until the sum totals would exhibit a frightful percentage of ailing humanity, and lend a color to the claim that 90,000 physicians were not enough by 90,000 for the wants of the people of the United States. This difficulty is perhaps one reason why deaths, which are visible facts, have been assumed to be the only factors obtainable by the statistician outside of governmental institutions and establishments.

Recently, the state boards of health, which are acquiring authority, as society learns their importance and witnesses the samaritan duty they perform, have attempted to obtain returns of *diseases dangerous to health*, but here, there is unfortunately no general agreement, for while North Carolina proclaims small-pox, diphtheria, cholera and yellow fever, to be such, Indiana includes all three but yellow fever, and adds typhoid, typhus, measles, whooping-cough and cerebro spinal fever. Elsewhere, the two latter are omitted and puerperal fever substituted, and with equal propriety the list may be made to include all the twenty-five maladies which are rightly regarded as pernicious and preventable,—those additional to the ones already mentioned being erysipelas, rötheln, varicella, mumps, influenza, relapsing fever, dengue, farcy, grease, glanders, gonorrhœa, syphilis, hydrophobia, and the plague,—a formidable array capable of still further extension, according to Richardson, if pyæmia, hospital gangrene, sloughing phagedona, malignant pustule, carbuncle, malarial fever, croup, catarrh and choleraic diarrhœas are included, and which, if not communicable in the ordinary sense, are indubitably dangerous to health and ought to be carefully enumerated and recorded. To these, tuberculosis, in the light of recent developments, must also be added.

[This paper will be completed in the next issue of THE SANITARY NEWS.]

ADULTERATION AND YELLOW FEVER.

A paper on adulteration of foods and drugs, by A. R. Leeds, Ph. D., was read for him by Dr. R. C. Kedzie, of Lansing Mich. The paper gave the subject attention from a chemist's standpoint.

The succeeding paper was on the yellow fever epidemic of 1882 in Pensacola, by R. B. S. Hargis, M. D., of that city, read in part by Dr. Devron, of New Orleans. Dr. C. J. Lundy, of Detroit, read a paper on school hygiene, covering especially the diseases of the eye, brought on by overstudy, bad lighting and poor ventilation.

INVITATION AND PAPERS.

In the evening, Dr. Devron read a telegram from the director-general of the World's Exposition, to be held in New Orleans, in 1884, inviting the association to hold its next meeting there during the exposition.

Papers were read on physical training, by Prof. J. M. Watson, of Elizabeth, N. J.; on physical culture, by Prof. D. A. Sargent, of Cambridge, Mass., and on the "Eminent Domain of Sanitary Science and Usefulness of State Boards of Health in Guarding the Public Welfare," by Dr. James E. Reeves, of Wheeling, W. Va. The last author dwelt upon the idea that school was the place and time to inculcate sanitary ideas in the children, who should be taught the dangers arising from accumulations of filth, as well as instructed concerning the apparatus designed by plumbers to prevent the air from sewers and drains from entering the house.

PULLMAN FROM A STATE MEDICINE POINT OF VIEW

was the subject of a paper by Oscar C. De Wolf, M. D., commissioner of health of Chicago. In the introduction he showed how the establishment of harmonious relations between capital and labor and civic sanitation influenced each other, and described the city of Saltaire, Peabody's bequest to the city of London, and the experiment in New York city of the association for improving the dwellings of the poor, thus introducing the city of Pullman, which is, as yet, the most important of these attempts to improve the condition of the working classes. The city was founded by George M. Pullman, of sleeping-car fame, who, in its foundation, intended to establish a city of homes for his employés, from which all criminally-debasing influences should be excluded. The reasons for selecting the present site were based upon certain economic factors, such as to make cars of a maximum quality for a minimum cost, which required the site to be outside of a city, where land could be purchased cheaply. Three thousand acres were secured, and the site for the city was chosen on the west shore of lake Calumet, a body of water three miles long and one and one-half miles wide, about twelve miles from the city of Chicago. The chief geological formation belongs to the drift period. There is alluvial soil to the depth of one foot, based on a bed of blue clay, several feet deep. The architect chosen was S. S. Beman, of New York; N. F. Barrett supervised the landscape gardening, and Benezette Williams, the sanitary engineering. Dr. De Wolf then described the buildings used as manufactories by the Pullman Car Company, and the Allen Paper-Car Wheel Works, and the water-tower, two hundred feet high, the tank having a capacity of one-half million gallons. He then described the dwellings, saying that, although they possessed much general resemblance, they were not barrack-like. Every house is of pressed brick and stone, and has a roof of slate arranged to show pleasant contrasts of color. There are 1,400 houses, and they rent for $6.50 to $65 per month, the average rent paid by workmen being $14. Every house has water and water-closets in the interior, and a very large proportion have bathing facilities. The prominent buildings are the Hotel Florence, the grand arcade, the market, the school-house and the church. The streets throughout the town are macadamized and have broad side-pavements bordered with green turf relieved at intervals with flower-beds, trees and fountains. The school-house is constructed according to the latest designs of school-house construction. The Pullman gas works are situated on the shore of the lake and produce water-gas which is used by everybody for lighting purposes, and by about 10 per cent. of the inhabitants for cooking and heating. Water is supplied by the Hyde Park water-works, five miles distant, connected with Pullman by a sixteen-inch main. From the top of the water-tower, already mentioned, the water is distributed through the city at an average pressure of 1,960 pounds to the square foot. The paper then described the sewerage system of the city in detail, and the method of disposing of the sewage on the Pullman sewage farm located three miles away. [Both the system of sewerage and the sewage farm have been fully described in previous numbers of THE SANITARY NEWS.]

Of the health of Pullman, Dr. De Wolf said that the town had now a population of 7,500, and its average annual population has been 5,000; during the two years of its existence sixty-nine persons died, its death-rate being, therefore, 6.9 per 1,000. The death-rate of the remainder of Hyde Park—a village of which Pullman is legally a part, and which in-

cludes much rural territory,—is 2.15 per 1,000. The causes of death were :

Zymotic diseases	23
Constitutional diseases	3
Local diseases	22
Developmental	3
Violence	17
Unknown	1
Total	69

The large percentage of deaths by violence is due to the fact that Pullman is the center of numerous railroads and the casualties attendant on its manufactures. The deaths under five years of age were thirty ; of these, twelve died from zymotic diseases, of which there died from cholera infantum, six ; from diphtheria, three ; from scarlet fever, two ; from septicæmia, (toy pistol) one. This favorable showing speaks for itself. Dr. De Wolf touched upon the influence of the city on its inhabitants, stating that the change in population from emigration amounts to 1 per cent. per annum, those who emigrate going forth educated in a way that entitles them to be called sanitary missionaries. There are no special requirements to induce change in the habits of people taking up residence in Pullman, but it is a matter of common observation that unsanitary habits, such as making cesspools of yards, etc., soon vanish under the silent but powerful influence of public opinion. There are no saloons in town, and one great cause of debasement is thus avoided.

In concluding, Dr. De Wolf said it should be remembered that from a purely monetary aspect, Pullman is a paying investment ; excellent monetary returns have been made on the capital invested, independently of all other considerations. From the facts already detailed it will be seen : (1) That the sewage of a town, if separated from the surface water and used on a farm in the vicinity of a market, can be profitably made into manure ; (2) that capitalists can find a profitable investment in the erection of towns built on sanitary principles for the occupation of their workmen ; (3) that the erection of such towns as Pullman and Saltaire has a very valuable and decided sanitary educational influence on the general population ; (4) that such towns, by improving the social surroundings of the working classes, tend to diminish the unrest which is one great factor in capital and labor conflicts ; (5) that this field is one which especially deserves the attention of philanthropists, since it increases the power of the person aided to help himself, does not take from him self-respect, and therefore has no pauperizing tendencies like the greater number of other philanthropic schemes ; (6) from every stand-point conceivable to the student of state medicine, these experiments of Titus Salt and George M. Pullman deserve study. In such cities epidemics must be infrequent. The causes of the degeneracy of the race must diminish. The unrest, which is the foundation of most of the nervous and mental diseases, must also be diminished.

THURSDAY'S PROCEEDINGS.

MISCELLANEOUS BUSINESS.

Resolutions were adopted at the morning session requesting congress to reënact the law of June 2, 1879, establishing the national board of health, now expired by limitation, and to make suitable annual appropriations for the purpose of experimental investigations, to be expended by the national board of health; thanking the surgeon-general and the national board of health for their sanitary work; requesting congress to supply a fire-proof building for the library and army museum of the surgeon-general's office, and requesting congress to continue to supply means for the publication of the index-catalogue of the surgeon-general's office.

An invitation was accepted to meet at St. Louis, in 1884.

The committee on the museum of hygiene made its report, and Dr. J. M. Browne, in charge, explained the aims of the museum.

The committee on vital statistics sent in its report, which was read by title. The advisory council for the year was announced.

The report of the committee on compulsory vaccination was read by Dr. S. W. Abbott, of Boston.

OFFICERS ELECTED.

The officers for the next year were elected as follows:

President, Dr. Albert L. Gihon, U. S. Navy.

First Vice-President, Dr. James E. Reeves, Wheeling, W. Va

Second Vice-President, Hon. Erastus Brooks, New York.

Secretary, Dr. Irving A. Watson, Concord, N. H.

Treasurer, Dr. J. Berrien Lindsley, Nashville, Tenn.

Executive Committee, Dr. Thos. L. Neal, Ohio; Dr. J. D. Gatch, Indiana; Dr. H. P. Walcott, Mass.; Dr. Gustav Devron, La.; Dr. Chas. Smart, U. S. Army; Dr. H. D. Fraser, S. C.

ESSENTIAL FEATURES OF HOUSE DRAINAGE.

A paper prepared by Rudolph Hering, civil and sanitary engineer, of New York, on "Essential Features of House Drainage and Practical Points Regarding Its Design and Construction," was read in his absence by Dr. Kedzie, of Lansing, Mich. It was as follows:

GENTLEMEN : In response to a request from our esteemed president to lay before you at this meeting a concise review of the principles of house drainage, such as are known and recognized to-day by the leading authorities, I respectfully present to you the following paper, hoping that it may contribute a small share towards a greater appreciation and comprehension of a subject which is of the highest importance to every person who occupies a modern dwelling.

The literature on house drainage is already voluminous. Every phase of its working, and every detail has been somewhere described, discussed and illustrated. However, if we regard the present actual condition of most of our houses, the correct principles will still have to be frequently asserted and re-asserted before such reiteration becomes a superfluous duty. Many times yet will the public attention have to be directed to this subject, in one way or another, before we shall all be able to answer affirmatively the important question, whether or not the house we occupy is entirely secure against the intrusion of unhealthy matters from our drains, through the air that we breathe or that pollutes our food and drink with its dangerous floating germs. It would be superfluous in the presence of distinguished medical men more than to allude to the dangerous qualities that may be possessed by air which has been in contact with decomposing organic matter, especially of an excrementitious nature. But it should be emphasized here that, whatever these dangers are, it is in the house, much more than in the streets, that they are most disastrous to the population. In the streets there is a chance for the foul matters to be mixed with an abundance of air, which circulates through them and passes out of the town. But in a house, carefully protected against winds and drafts, and often not permitting any exchange of air, the danger from foul substances suspended in it, becomes apparent and the more to be dreaded as most persons spend perhaps twenty hours out of every twenty-four indoors. It is therefore of the greatest importance to our comfort and health, to have our dwelling in a sanitary condition, Very few of our cities, however, can boast of even a fair drainage of their houses. Some have recently secured legislation looking to a systematic regulation of the plumbing, but as yet only a comparatively small number of buildings in each community have been benefitted thereby.

The reason can no doubt be partly found in the circumstance that the correct principles of house drainage are not generally known, even by all the plumbers who are usually entrusted with the work, and partly in the natural disinclination to expend money for altering a drainage which has perhaps so far caused no apparent ill effects. The consequence is that to-day thousands of buildings are still being provided with admirable means for conducting sewer air into their apartments.

With such results it is not surprising that some persons even decline to make use of modern plumbing appliances, and prefer old methods. The system itself receives the blame which is due only to improper execution of the work. Yet the principles governing a proper arrangement are simple and well established. All risks of perils from sewer air can be avoided if they are carefully and honestly carried out, not only in the general features of the design but also in the minutest detail.

In the following pages I have no novel ideas of any kind to lay before you. I shall give you nothing involving the uncertainty of new views or appliances, but only what has stood the test of time and discussion. During the few minutes at my disposal it will even be necessary to confine myself to outlines and essential features. These however will be sufficient to gain a clear comprehension of the question.

The cardinal requirements in the arrangement of perfect house drainage may be stated as follows: (1) A rapid and thorough removal of all liquid and suspended matter from water-closets, kitchens, sculleries, bath and bed rooms, etc., so that there is no cessation of flow, no eddy, or deposit from the moment the matter enters the pipes to the moment it leaves them. (2) The prevention of an escape into the house of

any air contained in the pipes under all the varying conditions of temperature, of the use and disuse of the different fixtures, through evaporation and the forcing or drawing of the water-seal in any traps. (3) A careful selection of the fixtures and the material to be used, and faithful workmanship in the making of all joints and the proper supporting and securing of every part of the work.

To justify these requirements, any further discussion is unnecessary. It will at once be observed that under the resulting conditions the generation of foul gases within the pipes is reduced to a minimum, and that their escape into the house is made impossible. It is true that the attainment of this end requires considerable skill, careful workmanship and good materials, but no more than is fully justified by the beneficial results obtained. It is also true that unless the above points are secured, the inhabitants of a house are much better off without any receptacle whatever, for any kind of refuse and waste water inside of its walls.

Let us now examine in detail the different parts of the system. The most natural order in which to give them will be to follow the waste matter as it passes through it. We shall therefore consider, first,

THE RECEPTACLES — These consist of water-closets, urinals, sinks, wash-basins, bath and laundry tubs. I shall speak of them in this order:

a. *Water-closets* are the most important receptacles, as the matter they receive is not only the most offensive, but can be, also, the most dangerous when coming from a diseased body. It is necessary that their selection should be carefully considered. Unfortunately, this has only rarely been done; many poor patterns have been introduced and but little attention is given to a proper fitting up and later to their maintenance. Foul odors about the closets are quite common and the fear of evil consequences has sometimes even caused them to be placed in a distant part of the building and isolated as far as possible. Dr. Hamilton, of New York, even wishes them placed outside the main walls of the house. Such banishment however is by no means necessary. A good closet, in connection with a proper arrangement of the house pipes, can be made quite inoffensive and in no way injurious. It will be impossible to speak of the large number of designs that are in use and it is only necessary to refer to their main features. They have been divided into several classes: The hopper, wash-out, valve, plunger and pan closets, and the latrines or trough closets.

The *hopper* closets are the simplest, and consist of a bowl narrowed at the bottom to a circular tube, which, after bending upward to form the trap, discharges into the soil-pipe. The sides of the bowl are liable to become soiled by excrements dropping upon them, and they are therefore not liked. Through the insufficient use of water they are also apt to become stopped up. These objections can be removed to a great extent if the bowl is properly shaped and glazed, and if the sides are flushed from the entire rim before use, as well as after, for which numerous appliances have been arranged. The area exposed to soiling is much reduced in the *short hopper*, which has the trap above the floor. The advantage of hoppers lies in the fact that whatever filth has not been completely removed can be readily seen and cleaned off by occasional scrubbing; also, that no mechanical parts are present to become disarranged, or to which filth may become attached.

The *wash-out closets*. These are a modification of the former, and consist of a bowl, the bottom of which is filled with water, and from which it is washed out sideways, into the trap. Their advantage over the hopper closet is that the excrements drop at once into a body of water, which is not as likely to soil the sides. The discharge is effected by a stream of water forcing or drawing the contents of the bowl through the trap by a jet or by siphon action. There are numerous designs in use of more or less convenience or efficiency.

The *valve closet* consists of a basin closed at or near the bottom by a small flap valve, kept in place by a counter weight and holding the water into which the soil is discharged. Drawing the valve allows the contents to drop into a small chamber in which the valve moves, and thence to pass through a trap into the soil-pipe. The large quantity of water ordinarily used for these closets thoroughly flushes the chamber and prevents deposits from lodging in it. The flaps, however, are apt to be leaky and allow the bowl to get dry. While this circumstance is not exactly objectionable, because no foul air will escape from the valve box, as this is ventilated, yet the advantage over hopper closets of receiving the excrementitious matter at once into a body of water, is thereby lost. Yet the best patterns of valve closets are preferred by some authorities to all others in use.

The *plunger closet*, in its best forms, is also a good one. Water is held in the bowl by a plunger closing its outlet, which is at the back or side of the closet. Drawing of the plunger permits the contents of the bowl to pass into a trap and thence into the soil-pipe. It has an advantage over valve closets in having the outlet closed by a parallel instead of angular motion of the valve, which is more apt to make a tight joint. A disadvantage, however, is found in the fouling of the plunger chamber, which is usually larger than the box in the valve closets and less perfectly flushed.

By far the most common, but also the most objectionable, is the *pan closet*. Its essential parts are the bowl, a pan swinging below it and holding the water which traps the bowl, and the so-called "container," a large iron vessel in which the pan moves. Advantages are not to be found in this closet. An objectionable feature, which should at once condemn it as a sanitary appliance, is the container, which receives the contents of the bowl, and must be so large in order to permit the necessary motion of the pan, that it can never be properly flushed, and consequently has its sides splashed and coated with filth, which decomposes and sends the foul air into the room every time the closet is used. Even a thorough and artificial ventilation of the container would not prevent this escape, as the displacing bulk of water is too large and sudden to allow the air to pass up a pipe, were the same provided, instead of at once entering the room.

The *trough water closets* are used where a number of closets are placed in a row as in schools, hospitals, etc. The separate seats are placed over a common trough or pipe, into which the excrements drop. Their removal from the trough is accomplished either by an automatic flush-tank placed at one end, or is left to the janitor, who flushes it at regular intervals, by simply opening a valve, either to allow the contents to run off, or to admit clean water, which drives them out. These trough closets are less expensive than as many separate ones, and if proper attention is given to them, are very satisfactory.

In general we can make the following demands upon all good closets: They should be as simple as possible, and have a minimum of moving parts which are more or less likely to get out of order. A closet with a complicated mechanism should always be condemned. The foul matters should drop into a closet as quickly as possible in order to deodorize them, as well as to prevent them, as much as possible, from touching the surface of any part of the closet. In hopper closets, this condition can only be approached with difficulty; but by making them short, to reduce the fouling surface, by placing the outlet pretty well back and by having an abundant flush of water, little trouble from the adherence of soil would be experienced. In fact, all closets should be liberally supplied with water, and in order to make the flush effectual, the whole quantity, about two gallons for each use, must be introduced suddenly. In the best closet it enters the bowl at once from around the entire upper edge, which is provided for the purpose with a so-called "flushing rim." The water rushes down the sides of the bowl with sufficient force to cleanse them, and, in the case of the "wash-out" closets, to drive out the contents of the bowl into the trap. The water used for flushing should be drawn from special tanks or cisterns, to be used for no other purpose. It is very objectionable to get it directly from the supply-pipes, except where a constant and great pressure of water can be had at the closet. For it often happens from various causes, that the available quantity in the pipes is so much reduced as to be quite insufficient for flushing. Sometimes the draft of water in a lower story will entirely stop its flow at the closet, and if a valve is open, even suck foul air back into the pipe and contaminate the water, which, later, may be drawn from a near spigot for drinking purposes. Hopper and "wash-out" closets, to work satisfactorily, should always be flushed from tanks. The former should, in fact, have automatic arrangements for the purpose, because the soil is not seen except in very short hoppers, and the flushing consequently is often neglected. [This paper will be continued in the next issue.]

Mr. Hering's paper was followed by one on "The Overhead Ventilation of Sewers," by William Oldright, M. D., of Toronto. [This paper will appear in a succeeding issue of THE SANITARY NEWS.]

DELEGATES.

The following gentleman were appointed delegates to the international sanitary congress at The Hague, and the medical congress at Copenhagen: Drs. Kedzie and Wight, of Mich., Smith, of New York, Ames, of Mass., Hunt and Newton, of N. J., Link, of Ind., and Waring, of R. I.

THE CARE OF HOUSEHOLDS.

The first paper of the afternoon was on the care of households, by Dr. Joseph H. Raymond, of Brooklyn, N. Y, describing the method of inspection of plumbing in that city, and the necessary requisites of house drainage. Many of the dangers attending the use of vaults were described. Precautions in placing water-closets were detailed. The pan closet was discussed. The absolute necessity for having traps free from danger of siphonage was dwelt upon. He said that hopper closets should not be used.

Col. Waring began the discussion and spoke of the futility of sanitary education, as evidenced by Dr. Raymond's remarks on the pan closet, adding that they could not be used one week without becoming an intolerable nuisance. As to hopper closets he thought Dr. Raymond entirely wrong, as the hopper closet was the best cheap closet which could be devised. He then referred to Dr. Oldright's idea of getting rid of sewer-gas, saying that the study should be not how to get rid of it but how to prevent its production. He said the greatest amount of sewer-gas entering the house was formed in the overflow pipes of wash-bowls and bath tubs and in the spaces under the water-closet seats, all of which were entirely unventilated.

Dr. Oldright asked if the ventilation of sewers should be in the street or through the house soil-pipe.

Col. Waring said he would not have any openings on the street, but would have the four-inch soil-pipe continue without interruption to the roof, and from the natural movement of air and varying temperature, causing the air to pass up one pipe and down another, he believed that the sewers would be thoroughly ventilated, especially if this ventilation is supplemented by the use of flush tanks which, by their periodical and rapid discharge, drive the air before the on-rushing water and out the pipes above the roofs of the houses, when the vacuum formed by the passage of water is filled by an indraught of fresh air. In reply to a question by Dr. Ames, he stated that no soil-pipe should be placed contiguous to the windows of an adjoining house, and they should always be carried above the roof-windows of their own houses, and said that after a thorough examination of such a system the air from the soil-pipe so ventilated was scarcely noticeable five feet away.

Dr. Bell criticized the Detroit sewerage, and Col. D. P. Haddin, of Memphis, stated that the sewerage system of his city was a complete success.

Dr. Wight believed in the separate system in every city.

Dr. Gihon mentioned the nastiness of the Chinese cities, and no pestilence, because of the immediate removal of excreta while fresh.

Dr. Devron explained the use of water-closets in use by some rich people connected with a receptacle some distance from the house.

Dr. W. F. Shehan, of Rochester, rose to denounce the old privy-vaults very largely used in Rochester.

OTHER PAPERS.

A paper on the problem of drainage in level lands, by Dr. W. C. Van Bibber, of Baltimore, was read by title.

A paper on dangers of fœcal matters disseminating, by Dr. W. S. Ross, of Madisonville, Ky, recommended the burning of garbage.

Dr. Ames believed that the trap on the main drain at the foot of the soil-pipe retarded the sewer-gas while the ventilators carried it off more slowly than it was generated.

Jno. K. Allen, of Chicago, gave the estimated profit of the Pullman sewage farm for the year ending October 31, as $4,500.

Dr. Oldright closed the debate on sewerage, believing that where there can be no guaranty that the sewers are perfect, it was better to have a trap at the foot of the soil pipe.

The paper on typhus fever, by Dr. E. H. Janes, of New York, was briefly outlined by Dr. George Rohè, of Baltimore. A very short but important paper was read by Dr. J. N. McCormack, of Bowling Green, Ky., on a practical point in the restriction of small-pox, his point being that the disease was not contagions until the suppurative stage was reached, and that the sick could often be taken in quarantine before that period arrived.

The paper on preventable contagious diseases, by Dr. David Ferguson, of Detroit, was read by title.

The important papers on sane humanity, by Rev. Hugh M. Thompson, of Mississippi, and on the increase of insanity in the United States, by Dr. Foster Pratt, of Kalamazoo, were read to an interested audience.

After the usual votes of thanks to the local committee, etc., the association adjourned.

Publisher's Department.

THE "COLUMBUS" WROUGHT STEEL SINK.

The Wrought Steel Sink made by the Kilbourne & Jacobs Manufacturing Company, Columbus, Ohio, is attracting the attention of the trade. It possesses some unique advantages over the cast-iron sink, which has so long held the market. Not only are points made in its favor from its greater strength, lightness, freedom from bad odor because of its being not nearly so porous as iron; but it is claimed that in its use, from its greater elasticity, not nearly so many dishes are broken as in the use of the common article—a claim which, if sustained, will go far to commend it to prudent housewives. The bowl and projecting thimble are stamped in one piece from the same plate, and, being of wrought steel, the makers are enabled to attach strainer and pipe more satisfactorily than is possible with cast sinks.

One of the strong points of these sinks is the new coupling, with which they are now supplied, and which is pronounced by all plumbers the best on the market. It is used with both lead and wrought-iron pipe; is a neat, reliable coupling, and is easily detached for the purpose of pumping out the pipe. The strainer and all parts of the coupling are tinned, and are furnished with all sinks without extra charge.

The fact of the great strength and durability of this sink, as it is practically free from danger of breakage in transportation, handling, or use, is a strong point in its favor, and that its merits are recognized by most competent judges is evident from the fact that leading houses, which have been interested in the common article have taken up the wrought steel sink. Orders come from all parts of the United States and Canada, and orders for two car-loads, 900 each, were received in one day this week from California.

James B. Clow & Son, are the sole agents for these sinks in Chicago.

THE KELLY PATENTS.

The Kelly Stop and Waste Cock, frequent mention of which has been made in these columns, has several useful applications. Its own action is clearly shown in the two advertisements which appear in this issue of The Sanitary News, one of which occupies a full page. Reference to the latter (page iv) will also indicate its application. It is claimed of it that it is positive in action, simply constructed and easy to operate, and that it is impossible for it to get out of order.

Special attention may very properly be called to its use in connection with the flushing-tank. The latter is air-tight, the water entering from the bottom, compressing the air. The force thus obtained in discharging the water secures a thorough washing of the water-closet bowl or urinal. These tanks can be made of cast or galvanized iron, porcelain, or any similar article, and, i deed, may be nickel-plated, or otherwise finished; under such circumstances the flushing-tank becomes an ornament. An additional advantage in the use of these tanks is that they are closed; dirt and other solid substances, which might clog the outlet, can not get into them. It would seem that they might be applied to use as storage tanks with great advantage; no one needs to be told that water in the common open tank soon becomes foul.

Testimonials are shown by the patentees, from all the leading architects in this city, who are said to be specifying the various patents very liberally. An illustrated catalogue is furnished on application.

THE BROUGHTON PATENT SELF-CLOSING WORK.

The E. Stebbins Manufacturing Company, of Springfield. Mass., are represented in an advertisement on page v, to which the attention of plumbers and architects is directed The speciality there noticed is the Broughton Patent Self-Closing Work, in relation to which a testimonial from the proprietor of a leading Boston hotel is presented. The E. Stebbins Manufacturing Company manufacture all kinds of plumbers' brass work, and the Broughton Patent Self-Closing Work is made only by them.

VALUABLE SANITARY APPLIANCES.

While there has been a marked improvement in the character of the work done by our practical plumbers during the past few years, these improvements would have been of little value had it not been for the introduction, from time to time, of valuable innovations in plumbers' fixtures. The Sanitary News takes pleasure in recording the opening of the Washburne & Moore Manufacturing Company's office and salesrooms at No. 17 West Forty-second street, New York. The appliances the firm manufacture have been handled by Messrs. Miller & Coates, of 279 Pearl street, New York, but the increasing demand for them has induced the firm to place themselves in direct communication with the trades using them.

The best known of these appliances is Moore's patent no-overflow basin and bath valves, and the patent sanitary water-closet "Eclipse." It is claimed of them that they have solved the

(*Continued on page x.*)

Current Topics.

To secure the insertion of matter which is both important and of immediate interest in this issue of The Sanitary News, the next in the series of articles on Chicago sewerage is deferred until the succeeding issue. The publication of other important matter is postponed for the same reason.

The delay in the issue of The Sanitary News for Nov. 15, which occasioned unexpected inquiry from many subscribers, who feared that their names had been omitted from the list, and who professed that they could not well do without the paper, was due to the fact that a full report of the proceedings of the American public health association was incorporated. As this association did not meet until November 13, and the meetings continued until the 16th, and were held in Detroit at that, it was necessary to delay the paper a few days, especially as a carefully-prepared report was made by its special representative, in attendance at the meeting. It is hoped that the abundance of excellent matter in that issue, when it did appear, more than counterbalanced the delay. Except in case of similar extraordinary circumstances, The Sanitary News will hereafter appear promptly on the date of issue; if any fail to receive it, after due allowance for time needed in transit, it is desired that they notify this office at once.

By a majority vote, the city council of Chicago has ordered the mayor to enforce the smoke-abatement ordinance.

There is a cremation society in San Francisco, but upon asking the common council for permission to cremate bodies, such permission was denied, the council deciding that the existing law required burial by interment. If the society is really in earnest it will not take much effort to get the law changed so as to permit cremation. It certainly should be so amended.

In carrying out the views expressed in The Sanitary News of November 1, by members of the American public health association, concerning the desirability of coöperation with Canadian health authorities and sanitarians, a resolution was adopted at the meeting of the association at Detroit, providing that the president appoint a delegation to represent the association at the next annual meeting of the Canadian sanitary association, which will be held at Montreal. It was gratifying to note that several Canadian sanitarians became members of the American association at the Detroit meeting.

The verdict of the coroner's jury in the Madison statehouse disaster, is not exactly what was expected from it. The verdict finds O. F. Nowlan, one of the contractors, guilty of grave error in causing a pier to be insufficiently repaired, at a point where the jury seem to think the building gave way first, and also finds D. R. Jones and H. C. Koch, architects, guilty of negligence in designing the internal construction without regard to its safety during construction.

The Sanitary News is in daily receipt of inquiries with reference to the laws and regulations governing plumbing in this city. Through the efforts of the city health department the state legislature passed an act, approved and in force May 30, 1881, which is entitled "An Act for the Regulation and Inspection of Tenement and Lodging-Houses, or other Places of Habitation." All the ordinances of the city were revised and reënacted by the city council on April 18, 1881, among them those relating to the sanitary features of buildings. Finally, the rules and regulations adopted by the health department, under the authority given by the city ordinances, have just been revised, and all are being generally enforced. The state act, the city ordinances and the rules and regulations of the health department are published on pages 40 and 41 of this issue in full. Chicago is really the first city in this country to do systematic work in the direction of securing the construction of healthy buildings, and especially good plumbing, from state enactments down to detailed instructions. Happily, the efforts of the authorities are supplemented by those of the master plumbers' association. This pleasant unanimity of action, as well as the legislation, may well be suggestive to other cities, and, indeed, may possibly be improved upon. The importance of the matter warrants the use of the space given to this subject.

Francesco Çortese, surgeon general of the Italian army, died Oct. 25.

At the regular annual meeting of the Parkes Museum of hygiene last month, the chairman, Sir Joseph Fayer, stated that there were one hundred and ninety members of the museum, and that since its opening five thousand persons had made use of it. During the winter a series of lectures will be delivered, an important one of the series being on the ventilation of theaters, by Mr. Liddon.

A phase of the recent accident at the Madison statehouse is brought out by the testimony of the workmen. One of them stated that he had noticed that a portion of the wall which, for security, should have been closed up solid, was left unfinished for the convenience of some workmen, who could thus handle their tools more easily. The witness knew he never had seen it done before, but it is presumed that he did not know whether it weakened the structure or not. There is a weak spot in the education of many mechanics on the strength of materials. They can put up a building according to specifications, possibly, but do not recognize that one method of construction may be safer than another. Another witness testified that the iron columns supporting the roof were very defective. This, of course, was the fault of the contractor, and an oversight of the inspector of materials, if there was one.

An esteemed contemporary characterizes the communication of typhoid fever by milk, as a mode never before dreamed of. The writer's knowledge of the subject, apparently, does not extend back of Shirley Murphy's recent investigation in the vestry of St. Pancras, but milk and the milk-can have not only been suspected of being vehicles of the typhoid poison, but it has been proved to be the case several times in the past few years.

There can be no great progress when sanitarians and sanitary periodicals continually jump up and down in the same spot, making a great deal of noise, but saying the same things which have been said years before. Unless there is

some addition to the amount of knowledge, or some new view of existing knowledge presented, there remains only to repeat already-published material for the sake of adding line upon line, and precept upon precept. That it is necessary to do this in order to educate the people at large is true, but the scientific press should relegate that portion of the work to the newspaper press, and utter only that which is of moment to the trades and professions which it represents.

A bill has been introduced in the Mexican congress, compelling the cremation of all bodies dead from yellow fever.

The secretary of the state board of health of California believes that there is danger that the germs of yellow fever will hibernate in Mexico during this winter, and the disease become epidemic again next summer. At any rate, there is necessity for watchfulness on the part of California authorities, to prevent the introduction of infected materials during the winter.

Mr. Henry L. Gay, a well-known and enterprising architect of this city, has arranged to open a permanent exhibit and exchange for building materials and appliances in Chicago. This enterprise will benefit not only those whose profession or occupation has to do with the designing and construction of houses, but the general public as well. If a man, by personal inspection, can determine for himself what bricks, lumber, roofing, plumbing and decorative material, etc., are best for use, and do it so readily as by visiting a permanent exposition of these articles, he will have simplified the matter of building very much, and secured a better habitation. Mr. Gay proposes to open this exhibition by February 1, in a central location, and it will be free to the general public. Instructed attendants will receive all visitors and give any information that may be desired, so that people are likely to be attracted to it as a means of pleasant and profitable recreation. The stimulus which will be given to good building, by the competitive exhibits, will be one of the encouraging features of the undertaking.

It is reported that there is a movement on foot, which, however, has but a few supporters, looking to the removal of surgeon general John B. Hamilton, of the marine hospital service. While Dr. Hamilton contiuues to keep the efficiency of his service where it is at present, there is no danger that he will be removed Even if there is danger, there is no necessity.

The ninth annual session of the New Jersey State sanitary convention will be held next week at Trenton. J. C. Bayles, C. E., editor of *The Metal Worker*, is president, and will deliver an annual address on methods of popularizing sanitary information. Among other subjects are, malaria, and methods of sewage-disposal without discharge into streams.

In considering the methods of popularizing sanitary information, the views to be presented by Mr. Bayles are, of course, unknown to The Sanitary News. There is no one method, however, which will popularize sanitary information to a greater extent, with an equivalent amount of labor, than the holding of meetings to discuss subjects not only of a sanitary character, but of a nature demanding the attention of political economists and tax-payers as well. Six or seven sanitary conventions, such as were held in London, Ont., and Baltimore, last month, and to be held in Trenton, New Jersey, and Ionia, Michigan, this month, will place a greater number of people in the way of securing healthy homes and healthy living, than the publication of several thousand state board of health reports each year.

If, in the course of a sanitary convention of five sessions' duration, three hundred persons (not a large estimate) are impressed with the idea that it is cheaper for their municipality to dispose of its sewage by the downward intermittent filtration and irrigation system, than to turn it to waste and permit it to be a wanton menace to a neighboring city further down the water-course, although sanitary science, as a science, has not made great progress, there has been averted a great possible danger to a large number of people. It is in this particular manner that people become better livers and keepers of their private and public charges, almost without becoming aware of the acquirement of any additional knowledge, by reason of attendance at sanitary conventions.

There is another encouraging feature connected with sanitary conventions, which is the cordial manner in which they are received and supported by the people of the localities in which they are held. The Sanitary News ventures to remark that the attendance at a health meeting, in the average town, would be as great as that at any convention called for purposes of religion or politics. Add to this the fact that they are usually managed by a committee of citizens of the locality, and the expenses are borne by local collections, and it augurs well for the future popularity of sanitary information.

Saginaw City, Michigan, is to have a complete sewerage system. Its location on the flat banks of a sluggish river makes its sewering a difficult engineering feat. The engineer in charge is Mr. Benezette Williams, of Chicago, author of the well-known Pullman system.

The sanitarians of Rochester, N. Y., are not allowing the field committed to their charge to go without cultivation. The section of hygiene of the academy of science are giving a course of free lectures, the programme of which shows that on Nov. 23, Dr. E. M. Moore, lectured on sewers in relation to sanitation. There are four other lectures on the programme ; respiration in its chemical aspects, by Prof. S. A. Lattimore ; our homes as they are and as they should be, by Dr. W. F. Sheehan, health officer of Rochester ; the disposal of sewage, by Emil Kuichling, C. E., and on bacteria and the germ theory of disease, by Dr. M. L. Mallory.

In his forthcoming annual report it is said that the surgeon general of the navy will recommend that the naval hospitals at Chelsea, Mass., Philadelphia, and Brooklyn be sold and the proceeds applied to the naval hospital fund, the interest from which, if invested in government securities, will make the system partially self-supporting. Instead of these mammoth structures he would erect small hospitals at places deemed necessary, but for acute cases only, chronic cases to be sent to a central station ; he recommends Norfolk as the

location. There is much in these recommendations of Dr. Wales to commend them to the thoughtful investigation of the secretary of the navy, and of members of congress. Because a hospital which has proved itself to be unfitted as a sanitary retreat for sick seamen has capital invested which may not be entirely realized from its sale, that fact should not debar congress from authorizing its sale, and the provision of a central hospital, built according to the requirements of modern hospital construction. Experience has shown that the various forms of hospitals, which may be classed under the general term of pavilion hospitals, have been better adapted to the treatment of the various diseases which appear in large bodies of men, than the massive thick-walled structures which were formerly so common.

At the meeting of the American public health association, at Detroit, and at the sanitary convention at London, Ont., at both of which places the subject of malaria was discussed, Pettenkofer's view that the appearance of malaria in winter was due to the migration of ground air and water in the soil, the high temperature of the house creating a suction, thus bringing the air and emanations from decomposing organic matters in the soil up into the house, was liberally supported. The idea that water and snow were carriers of the cause of malaria was also brought forward, Dr. Smart believing that in the filtration of ground water into wells, drinking-water became the vehicle. Both Pettenkofer's and Smart's ideas have the air of possibility, but the arguments have little positive interest until the cause itself is determined.

If the cause of malaria is a specific germ it could be thus carried by air or water. If the cause is a gaseous emanation, being nothing but a gas, and capable of being diffused throughout the atmosphere, it must be a powerful agent to produce such effects when diluted with free air. Carbonic acid gas is not a disturbing element until it has reached, perhaps, more than ten parts in ten thousand. If malaria is due to a gas, then it must follow that it is much more disastrous to the circulation than carbonic acid gas, because, if it were not, its presence should be detected if it ever reached ten parts in ten thousand. There is doubt in the minds of many if a gaseous emanation can produce recurrent symptoms such as attend intermittent fevers.

There are many ways of making joints in the soil-pipe, other than the absolutely safe way of double-lead-calking them. A favorite method with skin-builders is to fill the joint with putty, or plaster-of-paris, and blacken it over. Joints are often left entirely unfinished, the sections of the pipe being scarcely brought together. In such cases as these, the services of an expert plumber, or inspector, are almost necessary to detect the tricks of the wary skin-workers.

One branch of the really scientific work which the bureau of medicine and surgery of the United States navy is doing is shown to be valuable, from an examination of the beautiful micro-photographs which have been produced by members of the medical corps. These photographs represent the conditions of air, water, etc., when viewed with the discriminating aid afforded by the microscope. Some of the most interesting are those representing chains of micrococci in sewer culture-fluid, spores in torula form from scum from sewerage, specimens of dust in air of bedrooms (presumably unventilated), blood from patients suffering from typhoid fever, scarlet fever, and other diseases, foreign substances in air and sediment in water. The many specimens of moisture condensed from air show a heavy deposit of spores, crystallized substances, irritating solids, etc., one showing the condensation of air, long stagnant, being especially rich in foreign substances. These specimens show the necessity for thorough ventilation. A specimen of water through which air had been passed, was very well filled with foreign substances, bacteria, spores, etc., showing, inferentially, that air for breathing might be rendered much purer if passed through water before being introduced into rooms. To medical men, the structural changes in blood corpuscles shown at different periods of the invasion by typhoid fever and scarlet fever are suggestive.

In discussing the question of the relation of physicians to sanitary science, in a recent issue, it was not the intention of The Sanitary News to find fault with physicians because of their desire to secure laws for the suppression of quackery, as *The New York Medical Journal*, in a kindly critical editorial, seemed to read between the lines. Neither was the use of the words "medicinal administrators" intended as a taunt or an epithet to the noble profession. It is not of those members of the profession who, with disinterested motives, have followed lines of study entitling them to be called something better than physicians, namely, sanitarians, to which the criticism was directed. For physicians who are sanitarians as well, The Sanitary News has nothing but admiration. The article in question endeavored to show why the platform on which many physicians think a state board of health should stand should be broadened. Such a platform is very well described in a letter by Dr. William H. Cook which appears in the same issue of the *Medical Journal* with the editorial in which issue is taken with this journal. In writing of medical legislation in Ohio, Dr. Cook urges the legislature to "create a state board of health on which there will be just representation of each school of medicine that has in the state a chartered college maintaining an honorable educational standard in medicine, and an incorporated state society. Among its duties, let this board supervise medical practice in determining a standard of medical education by which to judge colleges in and out of this state." The Sanitary News believes the state board of health should be composed of those gentlemen of Ohio who, by their past record, are believed to be best acquainted with sanitary science, and this without reference to profession or calling. If the supervision of medical practice is to be among the duties of the board, it will consume all the time and energy of the board, and all other sanitary effort will be crowded aside and neglected. The board described by Dr. Cook would be an excellent board of medical censors for the examination of doctors and the regulation of medical practice, but as a state board of health it would be a complete failure. That the abolition of quackery would do away with much pain and unnecessary death, is not doubted, but this abolition should be accomplished by some other agent than the board devoted to hygienic instruction.

SUCCESSFUL HEATING AND VENTILATION.

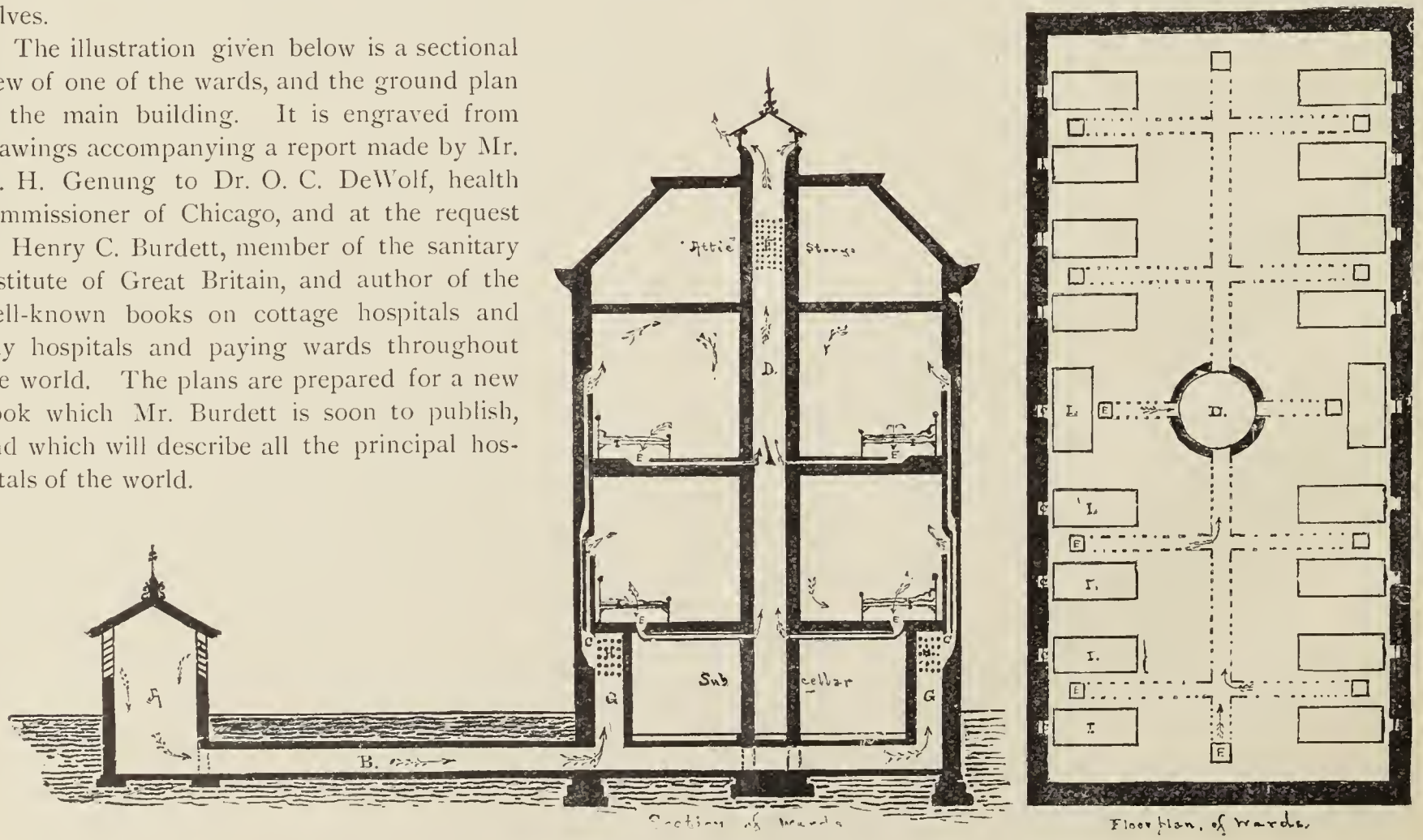
If the ventilation of a hospital is imperfect, the skill of the medical attendance cannot prevent a high death-rate. If the heating is inadequate, there is discomfort for the inmates; hence, when these two sanitary requisites are lacking the hospital ceases to fulfil its mission. If these comforts are carefully planned by the architect and conscientiously constructed by the builder, and if they work in a perfect manner after construction, the building thus provided calls for comment. Such is the Cook county hospital located in Chicago. In this building, the ventilation seems perfect. No odor of medicine or patient is perceptible in any ward. The surgical wards are equally pure and sweet. The fresh air inlet is a small tower (A), shown in the illustration below, about nine feet square and fifteen feet high, provided with a water-tight roof, and louvre sides under the eaves, the total openings equaling the area of the tower. From the bottom of this tower there leads to the main hospital building a large brick and stone duct (B) which enters the sub-cellar and, by ducts, the fresh air chambers (G); these are constructed of brick, and contain the wrought-iron steam-radiators, which heat the fresh air to a proper temperature as it passes through and over them on its way to the hot-air flues (C), which lead to the wards above. These hot-air flues are fire-proof, and are built in the outside walls of the building. They open a little distance above the head of each bed. The foul air is removed from the wards by means of ducts having openings at the side of each bed (E). These lead to a large foul-air shaft (D), extending from the sub-cellar to and above the roof, and are several feet in diameter. Very near the top of this shaft is a large steam radiator (F), kept at the highest temperature attainable with live steam. This creates such an up-draft in the shaft that a person standing at the bottom of it will lose his hat unless he is cautious. The supply of warm air is very accurately regulated by valves.

The illustration given below is a sectional view of one of the wards, and the ground plan of the main building. It is engraved from drawings accompanying a report made by Mr. W. H. Genung to Dr. O. C. DeWolf, health commissioner of Chicago, and at the request of Henry C. Burdett, member of the sanitary institute of Great Britain, and author of the well-known books on cottage hospitals and pay hospitals and paying wards throughout the world. The plans are prepared for a new book which Mr. Burdett is soon to publish, and which will describe all the principal hospitals of the world.

In regard to the ventilation of the building by a common foul-air shaft, it may be said that the objection to such a system which often arises because of a possible lack of heat at the top of the shaft, is removed at this hospital, as it is necessary to keep steam up continuously, without regard to the outside temperature, for hot water, washing and cooking purposes.

THE HENNEPIN CANAL AS AN OPEN SEWER.

One argument advanced by the Chicago advocates of the Hennepin canal is that an enlarged water-way to the Mississippi river will secure for this city an outlet for its sewage. It is strange that after the well-known experience of the cities of the old world and the practical demonstrations on this side of the Atlantic, that to turn sewage into any water course, or lake or ocean, means either its preservation, or decomposition in open air or somebody's water-supply, the same thing is repeatedly and often vehemently urged. Sewage is a waste which becomes harmful unless promptly reconverted into elements which are not only harmless but may be made profitable. Turning it into a water-course simply dilutes it, and postpones the day of evil which must come to those who drink it or breathe its liberated gases. Chicago's relief, afforded by a national, open sewer, running down through the state, is some other city's curse, and might only will make such a thing right. But there is another view to take: By wasting its sewage somebody is losing money. Properly collected and applied to the waste land around this city valuable crops may be made to grow where now there is nothing but a poor quality of prairie grass. The sooner the sewer argument is abandoned, the sooner will the Hennepin canal be built, and the better it will be for Chicago in the end.



Plan of Heating and Ventilation of Cook County Hospital, Chicago.

WATER-CLOSETS.—IV.

In 1778 Joseph Bramah had a patent issued to him for a water-closet with a valve at the bottom of the bowl, working on a hinge. This valve was for the purpose of cutting off all connection with the soil-pipe (Figs. 23, 24). It will be seen at a glance, that this closet was the forerunner of a large number of inventions, differing more or less from the original, of which the parent is certainly equal to, if not superior to, any of its offspring. All valve- closets with a horizontal valve working on a hinge, and the numerous patterns of pan closets, are an outgrowth from the Bramah. The valve works in a small chamber not much larger than the pipe. The mechanism is comparatively simple, and it

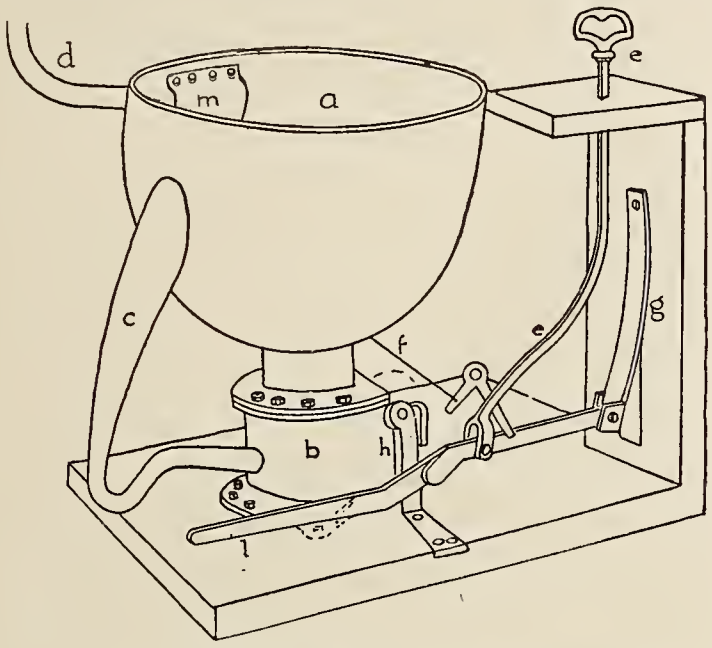


Fig. 23.—Bramah Closet.

a, Bowl. *b*, Valve-box. *c*, Overflow. *d*, Supply. *e*, Handle and pull-rod. *f*, Wire to tank. *g*, Spring. *h*, Valve-crank. *l*, Lever. *m*, Fan.

has a simple U-trap as an overflow. We also note the flap or fan placed over the supply-pipe for spreading the water over the bowl. We quote the following from the specifications: "In this closet two valves are simultaneously acted on by the handle. The one valve is placed under the bottom of the basin [bowl] and when closed retains any water that may be therein, thus cutting off all smell that may be therein. It moves

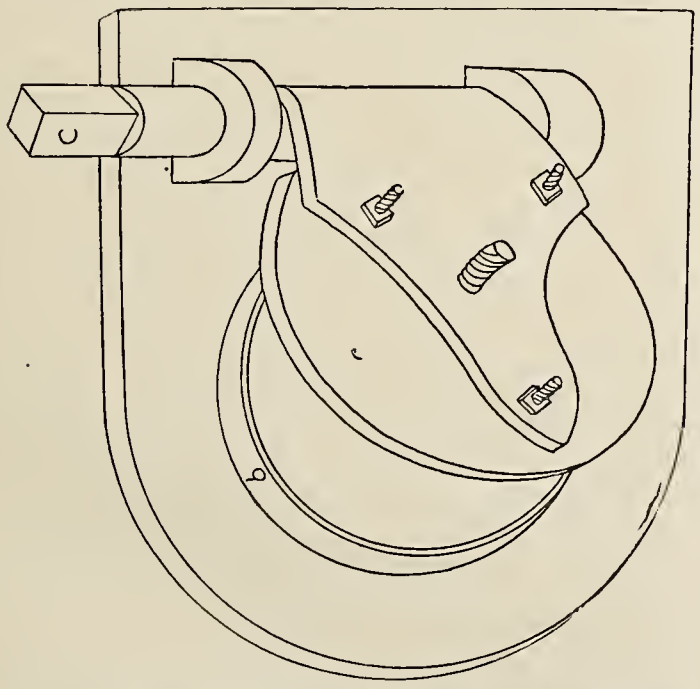


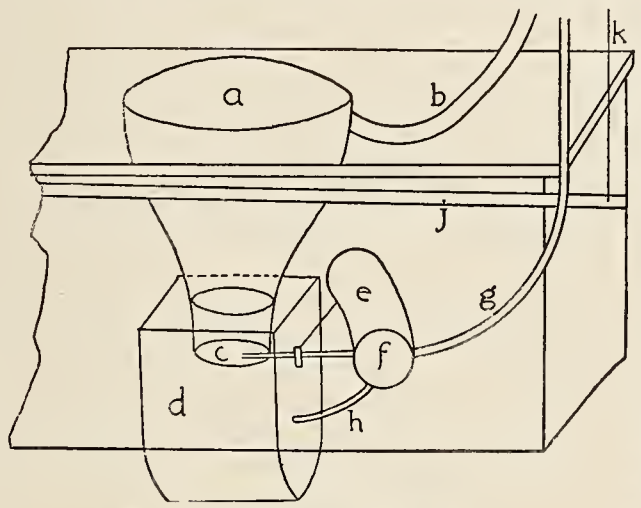
Fig. 24.—Detail of Valve in the Bramah Closet.

a, Valve. *b*, Valve-seat. *c*. Place for crank. *d*, Hinge.

on a horizontal axis, and in such a direction that its surface is the more thoroughly washed every time the contents of the basin are discharged, both by the water falling upon it whilst opening, and by its meeting the water when shutting to again. The other valve is placed in the service-box, or the top part of the feeding pipe ; this valve opens and shuts in a similar manner, always meeting the natural currency of the water, when shutting, and falls from it when opening, and is not liable at any time to have its action obstructed by the frost, no part of it being immersed in the water. Its movement is communicated through a lead-pipe or tube, soldered into the part where it acts, and is continued above the highest surface of the water in the reservoir." From the drawings it would appear that the bowls of the last three water-closets mentioned were made of lead, although there is no statement to that effect in the specifications.

Patents were issued to James Grease, 1782 ; David Riz, 1783; and Thomas Roundtree, 1789, for improvements on commodes.

In 1792 a patent was issued to John Ashley for "a New Invented Self-Acting Water-Closet (Fig. 25), which constantly keeps itself sweet and clean and is upon a more simple construction than any heretofore discovered." This is a valve-closet supplied by a tank, the hopper being flushed by pressure on the seat. The specifications say; "Any one sitting on the seat presses it down about an inch, which presses on the beam, and opens the sucker in the upper part of the double cistern and lets the water in, and when the person rises off the seat the upper sucker closes and opens the lower sucker and lets the water down the two pipes ; the one washes the basin [bowl] while the other fills the cod-piece and causes the air-ball to rise, the closer [valve] falls and lets out soil and water into said stink-trap, and by means of the small pipe the cod-piece is emptied of the water, the ball falls and raises the closer [valve] and prevents the effluvia ascending."



(Copy of Patent Drawing.)

Fig. 25.—Ashley's Water-Closet.

a, Bowl. *b*, Supply to bowl. *c*, Valve. *d*, Stink-trap. *e*, Cod-piece. *f*, Ball-cock. *g*, Supply to cod-piece. *h*, Waste from cod-piece. *j*. Beam. *k*, Wire to tank.

The common form of stink-trap is used under this closet, as we are told by the author, and in this way we gain as clear an insight into the form of trap used at that time as it is possible to do from such an imperfect drawing. It was probably something like our D-traps.

A patent was issued to Thomas Binn carpenter, 1793, for a valve water-closet (Fig. 26). It is very much like the Bramah closet, with the exception of the way the levers are arranged in connection with a complicated tank for the purpose of flushing the closet. Binn received a patent for an improvement on his closet in 1799. The improvement consisted in joining a bidet-pan to the bowl of the closet.

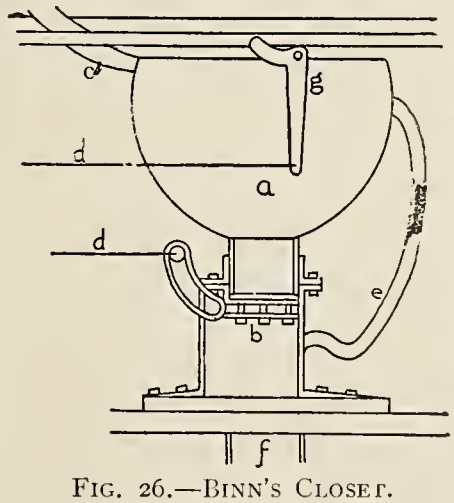


Fig. 26.—Binn's Closet.

a, Bowl. *b*, Valve. *c*, Supply. *d*, Wires to tank. *e*, Overflow *f*, Soil-pipe. *g*. Lever, worked by seat.

William Laws received a patent in 1796 for an improved water-closet. He shows us a receiver and a top view of a valve which he calls a pan. He does not claim novelty for either the pan or the receiver, so it is possible that there may have been pan-closets in use before the Bramah closet was invented, and therefore it may be wrong to cast the odium of their parentage upon it. The Laws' closet is intended to act on the seat being relieved from pressure. The handle is patented in connection with the self-acting closet, "*to put the self-acting part to rights, and may be found very useful at same time.* . . . . Another accommodation is a lever conveniently situated to act by the foot. . . . . The weight on the axis of the pan turns back to a catch, that holds the pan fast to bear the water for the next action of the closet.

The receiver or cess-pool is very much like those used on pan-closets at the present day.

The Consumers Construction Company have begun suit against the North Pier Foundry Company to recover over twelve tons of pipe which it is claimed was stolen and sold to the defendants.

ESSENTIAL FEATURES OF HOUSE DRAINAGE.—II.

BY RUDOLPH HERING, C. E.

[Continuation of a paper read before the American Public Health Association at Detroit, Mich., Nov. 13-16, 1883.]

All closets, furthermore, should be freely ventilated in themselves, and likewise the apartments in which they are placed, because there is always more or less odor escaping when they are used. The hopper and wash-out closets can have a special pipe leading from the bottom of the bowl to above the roof, in which a small gas jet is kept constantly burning. The valve and plunger closets can have a similar arrangement, the pipe leading from the chamber below the valves. While this ventilation is not absolutely necessary, because none of the above closets will permit much foul air to accumulate, it is nevertheless worth the slight additional expense, as the apartments can thereby be kept as free from odor as though they contained no closets. I have next to consider the

b. *Urinals*. Time will however permit me to say but few words concerning them. They need fully as much attention as water-closets, as an improper construction and careless use causes them to emit a strong odor. They should be given a proper shape and position, and an abundant and thorough flush of water. In hotels, railroad stations and places where they are constantly used a constant stream of water should trickle down the sides. For an occasional use, either an automatic flush or one obtained by hand should always be provided. And the water should be spread out so as to rush down over the entire surface which can be soiled by the urine. The most common pattern is a bowl fastened to the wall, and if well shaped and flushed it has no objectionable features. Another good form is a gutter running along the foot of the wall, which is provided with a face of ribbed slate, down the surface of which a constant fine stream of water is descending. The urine and water are, in both cases, led through a strainer into a pipe which should be trapped soon after leaving the fixture, as in the water-closets. The only ventilation required for urinals is a free exchange of air in the apartment in which they are placed.

c. *Sinks*, when used for chamber slops, should be designed similarly to urinals and be provided with means for flushing water over the entire surface from a rim along the upper edge, as they otherwise become very foul. It is best, however, to use water-closets for this purpose and abandon slop sinks altogether. When used for kitchen and pantry purposes this flush is not necessary, because they are usually washed out before there is much chance for decomposition. All sinks should have fixed strainers, in order to prevent large substances from entering the pipes. Their discharge pipe should be trapped as near the strainer as possible, to reduce the length likely to become foul.

d. *Wash-basins* require also but a few words. Being often placed in living rooms or sleeping apartments, the greatest care should be given to their proper arrangement, as the escaping drain air would be much more injurious than elsewhere. The simplest designs are here, too, the best. A simple earthenware bowl is better than Jenning's tilting basin, which readily becomes foul if not carefully and frequently cleaned. Wash-basins, like all other fixtures, should be trapped as near their outlet as possible. This requirement is here of special importance, as foul air escaping into a bed-room is doubly dangerous.

e. Concerning *Bath* and *Laundry Tubs*, there nothing further to say than that they should have as large an outlet as can be conveniently given them; from 1½ to 2 inches, in order to use the large quantity of water to the best advantage for flushing the house pipes. The opening, however, should have a strainer and the outlet pipe a trap near the same.

All the above-mentioned receptacles of refuse should have glazed or smooth surfaces and rounded inside corners and edges which avoids to a great extent the retention of filth. The material should be non-corrosive and non-absorbent. They should be placed in the apartments in such a manner that all the parts are exposed to view and to a free exchange of air. No greater mistake is made than to place tight casings around the water-closets and sinks. A ready proof of this is had in the foul odor emitted from such enclosures when they are occasionally opened. Modern plumbing appliances can, without objection, be left exposed to view. The space below them can have a free exchange of air, and being open, is more likely to be cleaned by servants than when hidden from view. From the fact that dripping is likely to occur under all the above receptacles, it is common to put a tray or "safe" below them, to prevent the water from soaking through the floor. Drip-pipes leading from them should never be connected with the drainage system, as they sometimes are, often permitting the fouled air to enter the room through a dried out trap; but they should be led either immediately outside of the wall into a rain leader, if this is trapped, or into the cellar.

Before leaving the subject of receptacles I should say that it is best to have as few of them in the house as convenient,—not because there is the slightest danger to be expected from them when properly fitted, but because they add expense out of proportion to the benefit. It is better to have a whole family to use one closet than two or three, because the one gets two or three times as much flushing, and is therefore kept in a better condition. The same holds good of wash-basins where a long disuse might, in addition, permit the water in the trap to evaporate and allow sewer air to enter the room. The fewer the fixtures, the fewer generally are also the vertical soil, waste and ventilating pipes, which reduces the cost and simplifies the system.

It should further be said that to preserve a sanitary condition of a house it is economical to use none but the best appliances. No saving of expense in this direction justifies the use of poorer ones. The best water-closets, I should add, are among the wash-out and valve patterns. Next come the short hopper and plunger closets. Special circumstances should decide the selection in each case. Pan closets, which unfortunately are the most commonly used, should be unreservedly condemned.

II. The Traps.—After having examined the various receptacles and mentioned that each one should be trapped as near to the fixture as possible, it now becomes necessary to speak of the traps themselves more in detail. Generally speaking, a trap (and I confine myself to the water-seals as the only reliable ones) is formed by a small depression or dip in the pipe in which the sewage is retained in order to prevent the passage of air. An endless variety of devices, purporting to accomplish this end, have been put into the market. A main requirement, however, of traps (as well as of the entire drainage system) is that there shall be no accumulation of matter and no deposit, and this condemns at once a large number, particularly the so-called "D" traps and bottle traps.

Another requirement has of late been urged, on the ground that gases are absorbed by water and that in the case of the sewer trap, gases from the sewer side might pass through the trap and escape on the house side. Dr. Fergus, of Scotland, was a strong advocate of this theory and supported it by a series of experiments. In compliance with this view a number of mechanical traps were proposed which, in addition to having a water seal, were to prevent the escape of gases, by means of a rubber or metal valve. This mechanical seal was at the same time to protect the trap against siphonage. Later experiments, however, especially those made by Dr. Wernich and Dr. Carmichael, show conclusively that, while the above proposition holds when the gas experimented with is in a very concentrated form (as used by Dr. Fergus), it does not hold good in the actual case of the sewer, where the concentration can never become great, even under quite unfavorable circumstances. Where sewer pipes are ventilated no transfer whatever of gas occurs. But even under adverse conditions and when gas actually penetrated the trap, Dr. Carmichael found that germs and spores in the water trap, however minute, did not pass through it. This result has been amply confirmed and we can safely return to the old and simple water seal as being a reliable barrier against the passage of injurious matter when the house pipes are properly arranged.

Traps are, however, exposed to mechanical difficulties which must next be considered. They are apt to lose their seal from two causes, by evaporation and siphonage.

Evaporation is likely to occur during the summer months if the traps remain in disuse for a long time. Two remedies are at hand. All plumbing fixtures in unoccupied apartments should be used at least once at stated intervals, to replenish the traps, or they should be disconnected from the pipes entirely. The latter, however, will hardly ever be necessary, as the period for replenishing the traps can be lengthened to many months if not a year, by having deep seals to them, by replacing the water with oil, and closing the outlet of the fixture with a stopper.

The loss of the seal by *siphonage* is a much more important matter as it occurs under conditions not readily seen or recognized while the conditions for evaporation are readily perceived. A trap can be siphoned either by the momentum of falling water, sweeping through and out of a trap, or by a compression or rarification, of air on one side as against the ordinary atmospheric pressure on the other side of the trap. Numerous ob-

servations and experiments are recorded showing how readily, under quite unsuspected conditions, siphonage may take place.

To guard against losing the seal by momentum, the only remedy is to have it as deep as possible and to destroy the momentum by making an abrupt change in the direction of the flow. Long hoppers are more likely to lose their seal in this way than any other fixture. Traps or small discharge pipes are not so much subject to this danger, as the momentum can only be comparatively small.

Far more important is the loss of seal by *uneven pressure* on the two sides of the trap. It will readily be seen that falling water in the discharge pipes, especially when almost filling them, will tend to compress the air below and rarify the air above. If equilibrium of pressure cannot readily be established in the pipe, it will establish itself by drawing out the seal of the upper and forcing out that of the lower traps. As this is an essential point to guard against in every drainage system, it becomes necessary therefore to provide quickly for both an escape and a supply of air throughout the whole system of pipes.

To determine the degree to which this is necessary, under varying conditions, various experiments have been made, notably those of S. S. Hellyer, in England; of Edward S. Philbrick and E. W. Bowditch, and of Col Geo. E. Waring for the national board of health.

Mr. Hellyer was very careful in his experiments and selected such conditions as occurred in his practice. He examined the cases when water-closets, baths, sinks, and wash-stands were placed over each other and connected with the same soil or waste-pipe. The diameters of the waste-pipes experimented with were 1½ and 2 inches, while those of the soil-pipes were 3 and 3½ inches. The water was poured into the receptacles under varied conditions and the results pointed positively to the necessity for guarding against siphonage, and that every trap or branch from it should be connected with the open air in addition to the ventilation required for the main pipe itself. His conclusion is given in the following words: "Where tiers of traps of any description are fixed upon one main pipe for receiving discharges from water-closets, slop-sinks, baths, quick-waste lavatories, etc., each individual trap or branch must be ventilated, if the traps upon the piping are to maintain their seals intact."

Messrs. Philbrick and Bowditch in their report to the national board of health give substantially the same conclusions, as determined from their own experiments, which were more varied in their conditions than either Hellyer's or Warings. They were also much more in conformity with actual practice in America than Hellyer's, and more in accordance with what we consider good plumbing than Waring's experiments. The more detailed conclusions may be stated briefly as follows:

Long hoppers should have a vent applied at the crown of the trap, as large as the soil pipe (4 inches) for at least one foot above the trap. Without this vent they were easily siphoned by a single bucket full of water.

Short hoppers with a trap above the floor should have a vent pipe at least 1½ inches in diameter, if more than a few feet in length and larger if passing to other floors above.

Whenever branches are led into a vertical waste or soil pipe with receptacles above, there is also a considerable risk of having the water seal of the trap destroyed, especially when it is shallow and has an easy bend and when the diameter of the discharging pipe is not much larger than the branch. It therefore is necessary to guard against this contingency by connecting the crown of such traps with the open air above the roof.

If the outlet of the main pipe is trapped and no fresh air inlet exists inside of it, the pouring in of water from the fixture can force out or blow out the trap of the fixture situated below the same. It is therefore necessary to provide means for the escape of air below the lowest receptacle.

The friction of air in small pipes is likely to cause its compression and a consequent forcing of traps where such compression occurs. It is therefore better to avoid special long and small descending pipes and lead all fixtures on upper floors directly into the soil pipes.

Among the different kinds of traps the S trap and P traps are the most easily siphoned, yet they are the least likely to retain any filth or deposit, because being simply a bent pipe, the water has a free flow through its entire bore. The round and bottle traps retain their seal much longer, but they cause eddies and always contain filthy deposits. They should only be permitted in old houses, in places where the introduction of a vent might be very inconvenient or costly.

Ventilation of traps is of no less importance in pipes smaller than four inches in diameter. The experiments showed that even a 2-inch S trap with 1⅝ inches seal, discharging into a 2-inch waste-pipe, open at the top, loses its seal by having one pint of water poured into it.

"The best and most simple remedy for the siphoning of traps in most cases, is undoubtedly to be found in the introduction of air at the normal pressure, at the crown of the trap." The experiment showed that, below the crown a vent will not be efficient.

"No definite rules can be given for the size or length of vent pipes. Yet it may be said that it is not safe to trust a vent pipe of less size than that of the trap it is to serve until we get above two inches in diameter, unless they are of only a few feet in length, before they join those of a larger size. Generally speaking, if vent pipes are long, their diameter should be as great as that of the pipe ventilated; if but a few feet long, a smaller diameter will answer."

The experiments made by Col. Waring led him to very different conclusions. He states that "the separate ventilation of traps, where the main soil-pipe is four inches in diameter and opened at the top, is unnecessary." Such a conclusion, contrary to all previous experience, naturally required verification, and it was therefore gratifying that Messrs. Philbrick and Bowditch were engaged by the national board of health to undertake the work, the results of which have been just mentioned.

Their experiments were conducted from an entirely different point of view. They show how and under what conditions the seal of traps were lost, while Col. Waring showed rather under what conditions the seal of traps were retained, a less valuable object, in my opinion, as it does not indicate so well the degree of danger to which the various arrangements are liable. Col. Waring's experiments were also much less varied, and the appliances which he himself considers superior to the ones experimented with, were not subject to a proper examination. He used pan-closets, through which the water was introduced and which considerably break its force, and therefore siphonage is avoided much more readily than in a hopper closet. And he confined himself principally to the examination of the effects of different patented waste water traps under various conditions but under the constant one of discharging through a 1½-inch waste-pipe, several feet in length, into a 4-inch soil-pipe. The particular traps experimented with had partly also a much deeper seal than ordinary traps, therefore naturally resisting siphonage to a greater degree. The S traps which are the best, were not sufficiently experimented with, yet they are more readily siphoned than any other trap. This omission, which was afterward filled by the experiments of Messrs. Philbrick and Bowditch, undoubtedly was the main cause for Col. Waring's conclusions.

In a recent paper, he still maintains his former position, confessing however that, while he does not believe in trap ventilation, he is "by no means clear as to the best substitute for it in all cases." While asserting also that "it is a make-shift attended with possible dangers at least equal to those which it is intended to remove," he in no way indicates even what he supposes these dangers to be. In the face of the experiments just alluded to, which positively show that trap ventilation can be made a perfect safeguard against siphonage, he remarks in a most uncertain strain, as follows: "So far as I can judge from all that has yet been said and done, the best solution of the difficulty will be, if it can be made practicable, to allow the use of no trap of any kind nor in any position which is not in full view whenever the fixture, is used, excepting, perhaps, certain subsidiary traps on kitchen and laundry wastes. If we can trap our wash-basins in such a way that the top of the water seal shall be always in view on looking into the bowl, and our bath-tubs in like manner, we will, I think, have secured the necessary safeguard, and we will have gained the further advantage, that persons of tidy disposition will see to it that a sufficient amount of fresh water is always passed through them to insure their constant cleanliness."

Granted that the "ifs" could be fulfilled, it would be an evil day for the general community to make the safety of traps depend so much on their being exposed to view. Siphonage occurs instantaneously, and the sewer air escapes until the next time the fixture is used, not waiting until persons of "tidy disposition" discover that the seal is lost. To speak in his own words, fixtures should always be not "pretty nearly safe," but "entirely safe."

Altata, a town on the western coast of the Mexican state of Cinaloa, has been nearly destroyed by a hurricane, and its people by yellow fever. The disease also prevails at Qualicon, the capital of Cinaloa.

VITAL STATISTICS AS SANITARY MONITORS.—II.

BY ALBERT L. GIHON, A.M., M.D., MEDICAL DIRECTOR, U. S NAVY.

[Continuation of a paper read before the American Public Health Association, at its meeting at Detroit, Nov. 13–15, 1883.]

The statistical reports, which the present surgeon general of the navy, Dr. Wales, has instituted and developed, illustrate so clearly what is possible in this direction that I may be permitted to ask the attention of the association to their scope.

Adopting the nosological nomenclature based on the English system and now in general use, they exhibit the actual number of cases of every form of disease treated, the duration of each case, its final disposition, whether cured, invalided to hospital, discharged from the service, or dead; the ratio of the daily number of sick per thousand of force; the number of sick days from each disease and for each vessel and station; and the number of sick for each decennial period of age from fifteen years to beyond fifty-five, for the several classes of men belonging to the navy, namely, officers of the line, officers of the staff, petty officers and seamen, ordinary seamen, landsmen, boys, firemen, coal-heavers and marines. These reports, which are complete for each vessel, hospital, navy-yard, etc., are aggregated according to the several geographical departments, the north Atlantic, south Atlantic, European, Pacific, and Asiatic stations, and for vessels on special service, naval hospitals, and shore stations; and these finally summarized for the naval service. These returns have now reached their fourth year. At the end of ten, they will provide a fund of information of incalculable value as to the geographical distribution of diseases, especially if other nations coöperate in the undertaking. Each ship or station will, moreover, have its own health history, showing defects of construction, or of administration, or the effects of cruising in more or less unhealthy regions.

Additional to this long array of figures, much of which it may be urged has rather a therapeutic than a sanitary interest, medical officers of the navy are now required to embrace in their quarterly reports a statistical summary, showing: (1) The diseases attributable to causes existing prior to enlistment; inherited, constitutional or undiscoverable affections; (2) Those attributable to climatic influences; (3) Those attributable to local unsanitary conditions; (4) Those having a venereal origin.

Returns of this sort have an exclusively sanitary monitorial value. In the first class are exhibited all cases of physical impairment through inheritance or personal indiscretion; the penalties for the disregard or defiance of the simple laws of well-being, which are visited in the person of the violator or his descendants; the lesions of nutrition and of the secerning apparatus, which are damaged in their effort to eliminate abnormal agents from the blood,

The second class comprises those due to the permanent meteorological and topographical conditions, which make up the characteristic climate of the locality; pulmonary disorders in variable latitudes; dysenteries and hepatic affections in the tropics; scurvy and frostbite in the frigid zones.

The third class contains those resulting from local unsanitary preventable influences; the zymotic diseases, and those due to improper diet and water; diphtheria, enteric fever, scarlatina and the like; and until it can be established that malaria is not a remarkable condition, but an enduring characteristic of a climate, the intermittents and remittents will naturally group themselves here.

In the fourth class are all the venereal affections, which, though many, are capable of being included in the first class, are sufficiently numerous for subdivision of their own.

My chief object in presenting this paper is to bring prominently before this association and the sanitary organizations represented in it, this attempt of the bureau of medicine and surgery of the navy department to create statistical etiological returns, which shall be of value as hygienic indicators; solemn, warning voices to the self-destroyer; guide-boards and beacon-lights to the heedless over the mauvaises terres and upas valleys, which are fatal to the sojourner who lingers in them; danger signals to the reckless and ignorant who defy foul air, bad food, moisture and filth; moral teachers to the young who listen to the siren voice of the scarlet woman who "lieth in wait at every corner."

I cannot too strongly urge the absolute necessity of securing accurate returns of these classes of disease, and I do this without in any way disparaging the interesting and valuable work done by the registrars and secretaries of health boards in the exhibition of mortality returns. Nothing can be more beautiful than the chartographic tablets accompanying the reports of the board of health of Philadelphia, the work of its former secretary, Wm. H. Ford, M. D., especially valuable for the meteorological exhibits incorporated with them; and the topographical charts, which accompany the annual reports of Dr. Smith Townshend, health officer and registrar of the District of Columbia, which are models of excellence, and only need to have figures showing the number of cases of preventable diseases substituted for the number of deaths from these diseases to be all that is required. Dr. Ford did outline, chromographically, in a general way, in his report for the year 1874, the mortality due to epidemic influence, and to climatic influence for the years 1872-3-4, separately and summarily for the period from 1867 to 1874; but I repeat what I have so often insisted, that deaths, especially as the science of medicine enlarges its influence on general practice, are not exact indices of the amount of morbific infiltration of a community. Do deaths from enthetic diseases, five of these from congenital syphilis, represent in any degree the actual venereal contamination of a city like Washington, with its population of 195,000? Will 121 deaths from malarial and typho-malarial fevers account for the miasmatic representation possessed by this beautiful capital, or explain why its people have become veritable quinivora? Would congress have entered upon the work of filling up the flats on the river front, which are believed to breed malaria, if it had been supposed that 3,412 per thousand of the 24.230 per thousand deaths were all the damage done by this class? And pertinent to this very subject of malaria, I would be unjust to my friend, Dr. Smart, of the army, if I failed to credit him for his attempt last year to obtain precise returns of the number of cases of malarial affections in several of our cities, which, in connection with a proposed examination of the drinking water of these places at the several seasons of the year, would have been a very advanced step in the direction of sanitary, statistical investigation, I have advocated for this and other classes of disease. Unfortunately, the failure of the appropriation for the national board of health, for work of this character, compelled his abandonment of his admirably-devised scheme. Meanwhile, a nation which many of us are accustomed to look upon as an apprentice in modern methods, has undertaken the work, of which we are discussing, not the utility, but the feasibility. Japan is publishing returns of the whole number of cases of certain diseases in the empire; and, just as this people have developed and improved upon our postal and census systems, we may expect them soon to offer us the example of a perfected scheme of the mortality returns I have here proposed.

Dr. Sternberg, yesterday, lamented the absence of civic statistics of disease, and you were yourselves judges of the valuable deductions he was able to make from the exact statistics of disease furnished by the army records. If data, supplied by the limited number of selected men, mainly adults, comprised in the army and navy, being under exceptional conditions of hygienic oversight, and in restricted localities, can give us information of such weight, what might not be the sanitary lessons taught us by statistics of disease embracing every man, woman and child in a population embracing the very young and the very old, the weak and the robust, beggars and princes; and how soon might we not expect to find the key to unlock the mystery of morbid phenomena?

Not to be behind the fashion of the day, the vital statistician has got to arranging himself in the latest style of mathematical garb, and, after a lesson or two, even the sanitarian, who has prided himself on his simplicity, parades in a mystic dress at which he ought to laugh when it is mirrored back to him. The ordinates of the curve of probabilities rise like a haze on the horizon and threaten to overcloud our fair sky. Let the idler at his desk while away his time ciphering possible errors and limits of probability in mortality returns; but let us content ourselves endeavoring to ascertain, first, how many are actually sick, and, second, how many of these die. Even though our numbers fall somewhat short of the truth, we will learn enough at least to warn us of where typhoid fever, diphtheria and scarlatina have their habitat. We will find where yellow fever has sown its mysterious germ, and head off the phantom figure of cholera. We will stamp out the spark of variola, and detect the sneaking, creeping, slimy serpent of syphilis among the fairest flowers of our garden.

These are lessons that need no enforcement by long equations and mystical combinations of literal symbols, and seven-place decimals headed

by ciphers. Enteric fever thrives, and Ford's colored curves may show us when, and Townshend's topographic numerals show us where. The enlightened sanitarian reads the danger-signal, and suggests the remedy. There a gaunt, sallow, dejected set of men, women and children either rattle their bones in unison or bewail their splitting heads and rub their aching joints, or listlessly loiter through life. They do not die, but when their home is known to be the haunt of that malign fairy, malaria, the sanitary engineer has his work blocked out for him. Exact returns may not be possible at the outset, but the naval medical tables are the suggestion of an exhibit of zymotic and climatic disease causation, by which health boards may profit. Continue likewise the records of deaths as an element of mortality returns, and of births and marriages if you like, but give the latter a sanitary significance by showing the number of unfruitful or sparsely fruitful unions which characterize certain social classes. The American public health association will then be doing legitimate work, and the sanitary monition it utters may be appropriately echoed from every pulpit as a warning to the righteous sinners, who menace the perpetuity of the race, that they may not cull pleasure's flowers without paying nature's prices.

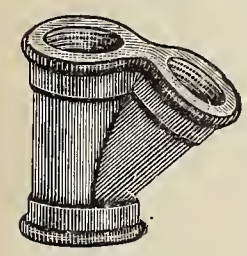
THE MANUFACTURE OF SANITARY APPLIANCES.—II.

CAST-IRON FITTINGS.

In the preceding article the subject of the manufacture of brass fittings was described, special attention being given to the work of making the cores for the casts of hollow articles. In this paper the manufacture of cast-iron fittings will be discussed.

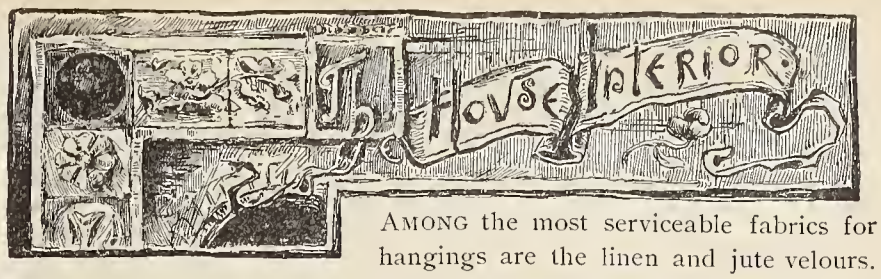
The cores are made substantially in the same way as those for brass casts, except for the heavier articles, those being made by men instead of girls. American iron ore is largely used for the manufacture of cast-iron fittings. The pouring of molten metal for casts, which are all of the same pattern, is not difficult work, and regular, skilled moulders, who have served their time, are not employed for this purpose. A man with six months' experience can pour these casts as well as those having years of experience in it. In casting the smaller pieces, such as return-bends, etc., many are cast in one mould at one pouring, the moulds being large enough to receive the impressions and cores for a large number of each variety. When the casts are cold, the moulds are opened and the casts taken out, covered with sand. They are then dumped into rapidly-revolving angular cylinders, together with a large number of pieces of iron resembling exaggerated jackstones. In the vigorous churning received in these cylinders, the fittings are entirely freed from sand and dirt and receive a semi-polish. They are then delivered to boys, who chip off the projections and rough edges that remain where the gate (as the runway for the molten metal in the mould is called) is broken off. The same boys also assort them, and they are then delivered to the workmen, who rim, trim, thread, drill, or otherwise perfect the fittings for their ultimate use. The machines for cutting threads in the iron fittings are quite as ingenious as those for working the brass, and quite similar to them. One "four-chuck" machine is contrived simultaneously to cut the threads in four "three-way tees," as fast as one man can feed the machine. It delivers the tees automatically. The taps used in cutting the threads are, of course, constantly "flowed" with oil to prevent heat by friction; the fittings, when all are cut, are covered with a disagreeable black oil, which is removed by immersion in a chemically-prepared bath, after which the fittings are ready for the market. The iron shavings, cuttings and trimmings are also covered with oil. To remove this, they are placed in a pan which, when full, is set on a shaft having two thousand revolutions a minute; the oil is thrown by centrifugal motion from the pan into a drip-pan, where it is caught and saved for use again. The iron cuttings, thus cleansed from oil, are sold to foundry men to use in their furnaces.

RETURN BEND BACK OUTLET.



Y BEND.

William Scott, of Rotherhithe, was one of the most violent of the many anti-vaccinators in England. Small-pox recently killed his wife and three children. Then Mr. Scott took the coward's course to escape the stings of conscience over the result which might have been prevented, and committed suicide.



Among the most serviceable fabrics for hangings are the linen and jute velours. They are firm in texture, with a close, velvety surface, resembling corduroy. They cannot be injured by moths, and will bear the most vigorous shaking and dusting. They can be obtained in all the desirable colors, the Indian and pomegranate reds, yellows, olive and biscuit colors being especially good. The double-faced velours is intended for portierés, as it requires no lining and hangs well. A recently-imported material, which is excellent for window and door hangings, is Indian cotton. It is a soft, loosely-woven fabric, similar to cheese-cloth, though thicker and coarser in texture. It is found in Indian red and in creamy white. These materials have been effectively employed by the decorative art society in some work recently finished for the new Union club building. A portieré for a wide door between the hall and parlor has one side of yellow jute velours with a dado of the same fabric in olive. Above the dado is a band of white oatmeal cloth, having an applique-scroll design in golden browns and red, outlined with gold. A knotted fringe of different lengths finishes the decoration. The other side of the hanging toward the hall is of pale pomegranate velours with a band of olive near the bottom. This band is crossed with gold and fastened at each intersection by a shaded pompon. Another portieré is of heavy red serge powdered with groups of short curving lines in blues and yellow and finished with pompons and tassels. The other side is of indigo-blue silk sheeting with applied discs of shades of golden brown outlined with gold cord. Some of the discs are set against back grounds of light blue, giving an admirable effect of light and shade to the whole. A hanging for a single doorway is of red Indian cotton, its narrow width requiring three lengths, which are joined by fancy stitches in yellow silk. Narrow, perpendicular bands of yellow velours are set on at the top and bottom, the spaces between being filled with tasseled cords of different lengths. This drapery has the reverse side of pale blue silk sheeting, and is interlined with canton flannel, to give it the requisite weight for hanging effectively.

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Natural flowers are to play an important part in both personal and house decoration during the social season which has just opened, and in this, as in every other expensive fashion, there is danger that the original idea of beauty and appropriateness may be lost sight of in a foolish rivalry and a vulgar lavishness of display. The florist, in whose hands the decoration is often unquestioningly placed, is obliged to sacrifice good taste to the demand for show, and instead of going to nature for suggestions of arrangement, seems to strive to crowd as many flowers as possible into a given space. As a result, one sees banks of solid bloom bells, ships, birds and other phenomenal forms which serve the purpose only of showing how many beautiful blossoms can be wasted in producing travesties of objects, which are unsuitable both in their natural forms and floral counterfeits for decorative uses. Nature is bountiful, but never wasteful, and in her wildest floral freaks grace, beauty and freedom are never sacrificed. Cut flowers loosely arranged in carefully chosen vases or well-shaped baskets, with their own foliage, where it is possible, are always beautiful, and can be enjoyed without the feeling of confusion which a meaningless mass of closely-packed blossoms always gives. Vines and trailing sprays may be effectively used on bare wall spaces, or where it is desirable to soften a sharp angle or outline. A spray of smilax or ivy thrown against a bit of crimson drapery, or a feathery clematis vine on the folds of a gold-colored fabric, may be used with admirable effect for the corner of a picture frame or basket. In heated rooms, crowded with people, flowers of heavy powerful odors should be sparingly used, or altogether excluded. The perfumes of hyacinths, tuberoses and some tropical lilies affect many people like poison, and no thoughtful hostess will incur the possibility of annoying a guest by their presence.

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When the interest in æsthetic decoration and furnishing first became general, it seemed as if the way had been opened for the expression of individual taste, which should give a stronger personality to each

home. But, where this interest has degenerated into a fashion, it has worked its own undoing by a confusion of heterogenous ornaments, beneath which the idea of honest use has been almost wholly lost. A general prevailing style will always be found both in furnishing and dress, but it should be so flexible that it can be adapted to the requirements of each individual of the household. In no other way can beauty and healthfulness in everyday living be attained. William Morris, who has struck some ringing blows at wastefulness and pretense, says: "I believe there are two virtues much needed in modern life, if it is ever to become sweet. These virtues are honesty and simplicity of life. Though simplicity in art may be costly as well as uncostly, at least it is not wasteful, and nothing is more destructive to art than the want of it. I have never been in any rich man's house which would not have looked the better for having a bonfire made outside of it of nine-tenths of all that it held." The last assertion is rather sweeping, but one calls to mind many houses of the rich, and of those who are sacrificing liberty and comfort to copy the follies of the rich, in furnishings and decorations of inferior quality, where such a bonfire would greatly advance the interests of true art and healthfulness, and, at the same time, free the losers from the bondage of luxury and envy.

Martha Howe-Davidson.

THE REGULATION OF PLUMBING, HOUSE DRAINAGE, ETC., IN CHICAGO.

The following is the act of the general assembly of Illinois for the regulation and inspection of tenement and lodging-houses, and other places of habitation; the ordinances of Chicago relating to the sanitary construction of houses, and rules, regulations and certificate of instructions relating to plumbing, drainage, etc. They indicate the authority of the health department, and are given in full.

THE STATE LAW.

1. Architect—Plans.] § 1. *Be it enacted by the People of the State of Illinois, represented in the General Assembly*, That it shall be the duty of any architect or architects, builder or builders of, or other person or persons interested in any projected tenement, lodging-house or other places of habitation in any incorporated city of fifty thousand (50,000) inhabitants, to submit plans and specifications of any such building or buildings to the health commissioner or commissioners of such incorporated city, that the said health commissioner or commissioners may examine the said plans and specifications, for his or their approval or rejection as to the proposed plans for the ventilation of rooms, light and air shafts, windows, ventilation of water-closets, drainage and plumbing.

2. Duty of Plumber.] § 2. It shall be the duty of any plumber or other person or persons interested in the contract for the plumbing work of such building or buildings, to receive a written certificate of instruction from the health commissioner or commissioners before commencing work on the said building or buildings, and to proceed according to the plans, specifications and instructions, as approved by the health commissioner or commissioners of said city.

3. Health Commissioner—Notice.—] § 3. It shall be the duty of any plumber or other person or persons interested in the plumbing work, after the completion of said plumbing work, and before any of the said plumbing work is covered up in any building or buildings, or on the premises connected with said building or buildings, to notify in writing the health commissioner or commissioners, that said building or buildings, or other premises are now ready for inspection, and it shall be unlawful for any plumber or other person, or persons, to cover up, or in any way conceal such plumbing work in or about such building or buildings until the health commissioner or commissioners approve of the same.

Architect — Penalty.] § 4. If any architect or architects, builder or builders, violate the provisions of this act, he or they shall be fined in a sum of not less than $100, nor more than $200 for each offense.

5. Penalty—Plumber.] § 5. If any plumber or other person or persons interested in the plumbing work, violate any of the provisions of this act, he or they shall be fined in the sum of not less than $100 nor more than $200 for the first offense and the further penalty of $10 for each and every day such plumber or other interested person or persons shall, after first conviction, neglect or refuse to comply with any provisions of this act, or the written instructions of the health commissioner or commissioners, and for the second offense, a like penalty and a forfeiture of his or their license to do business in said city for one (1) year after conviction.

CITY ORDINANCES RELATING TO HEALTH.—ARTICLE XXVII.

§ 1347. That no person shall hereafter erect, or cause to be erected, or converted to a new purpose by alteration, any building or structure which, or any part of which shall be inadequate or defective in respect to ventilation, light, sewerage, or any of the usual proper or necessary provisions or precautions for the preservation of health, nor shall * * * any matter or thing * * * be * * * in or about any such building or structure dangerous or prejudicial to health.

§ 1348. That * * * any building or any part thereof * * * in which any one may dwell or lodge, except when said buildings or such parts thereof are sufficiently lighted, ventilated, provided and accommodated and in all respects in that condition * * * for which this article or any law of this state provides or in which they or either of them require any such premises to be. * * *

§ 1354. That * * any tenement house, boarding house, lodging house or manufactory shall * * be provided for the accommodation thereof and for the use of the tenants, lodgers, boarders and workers thereat adequate privies or water-closets, and the same shall be adequately ventilated * as not to be offensive or dangerous or detrimental to health. And no offensive smell or gases from or through any out let or sewer, or through any such privy or water-closet shall be allowed * * * to pass into such house or any part thereof or into any other house or building.

§ 1358. Every house, building or portion thereof in the city * * * designed to be used, occupied, leased or rented, or which is used, occupied, leased or rented for a tenement or lodging house shall have in every room which is occupied as a sleeping room and which does not communicate directly with the external air, a ventilating or transom window having an opening or area of three square feet over the door, leading into and connected with the adjoining room. If such adjoining room communicates with the external air, and also a ventilating or transom window of the same opening or area communicating with the entry or hall of the house, or where this is from the relative situation of the rooms impracticable, such last mentioned ventilating or transom window shall communicate with an adjoining room that itself communicates with the entry or hall. Every such house or building shall have in the roof at the top of the hall an adequate and proper ventilator, etc

§ 1360. Every * * * building shall be provided with good and sufficient water-closets or privies, which shall have proper doors, traps, soil-pans and other suitable works and arrangements, so far as may be necessary to insure the efficient operation thereof.

§ 1361. Such water-closets or privies shall not be less in number than one to every twenty occupants of said house; but water-closets or privies may be used in common by the occupants of any two or more houses, provided the access is convenient and direct, and provided the number of occupants in the houses for which they are provided shall not exceed the proportion above required for every privy or water-closet.

§ 1362. Every house situated upon a lot or street in which there is a sewer, shall have the water-closets or privies furnished with proper connection with the sewer, which connection shall be in all parts adequate for the purpose as to permit entirely and freely to pass whatever enters the same.

§ 1363. All such water-closets and vaults shall be provided with the proper traps and connected with the house sewer by a proper tight pipe and shall be provided with sufficient water and other proper mean for flushing the same.

§ 1370. It shall not be lawful hereafter to erect for, or conver to the purposes of a tenement or lodging house, a building on the front of any lot where there is another building on the rear of the same lot, unless there is a clear open space exclusively belonging thereto and extending upwards from the ground of at least ten feet between said buildings, if they are one story high above the level of the ground; if they are two stories high the distance between them shall not be less than fifteen feet; if they are three stories high the distance between them shall be twenty feet; and if they are more than three stories high the distance between them shall be twenty-five feet. At the rear of every building hereafter erected for or converted to the purposes of a tenement or lodging house on back part of any lot, there shall be a clear, open space of ten feet between it and any other building. But when thorough ventilation of such open spaces can be otherwise secured, said distances may be lessened or modified in special cases by a permit from the department. * *

§ 1371. In every house hereafter erected or converted every habitable room except rooms in the attic shall be in every part not less than eight feet in height from the floor to the ceiling; and every habitable room in the attic of such building shall be at least eight feet in height from the floor to the ceiling throughout not less than one-half the area of such room. Every such room shall have at least one window connecting with the external air, or over the door a ventilator of perfect construction, connecting it with a room or hall which has a connection with the external air, and so arranged as to produce a cross current of air. The total area of window or windows in every room communicating with the external air shall be at least one-tenth of the superficial area of every such room, and the top of one at least of such windows shall not be less than seven feet and six inches above the floor; and the upper half at least shall be made so as to open the full width. Every habitable room of a less area than one hundred superficial feet, if it does not communicate directly with the external air, and is without an open fireplace, shall be provided with special means of ventilation by a separate air shaft extending to the roof or otherwise as the commissioner * * may prescribe.

§ 1372. Every house hereafter erected or converted shall have adequate chimneys running through every floor, with an open fire-place or grate, or place for stove, properly connected with one of said chimneys for every family and set of apartments; it shall have proper conveniences and receptacles for ashes and rubbish; it shall have water furnished at one or more places in such house or in the yard thereof, so that the same may be adequate and reasonably convenient for the use of the occupants thereof; it shall have the floor of the cellar properly cemented so as to be water-tight; the halls of each floor shall open directly to the external air with suitable windows, and shall have no room or other obstruction at the end, unless sufficient light and ventilation is otherwise provided for said hall in a manner approved by the commissioner. * *

§ 1389. That it shall be the duty of every person using, making or having any drain, soil-pipe or passage to connect with any sewer from any ground, building, erection or place of business, and in like manner the duty * * of all departments, officers and persons (to the extent of the right and authority of each) to cause and require that such drain, soil-pipe, passage and connection shall at all times, be adequate for its purpose, and such as shall convey and allow freely and entirely to pass whatever enters or should enter the same.

§ 1393. That no water-closet, sink, tub, vat or other structure shall hereafter be constructed within the city of Chicago having connection with or by any sewer or underground passage, unless the same is provided with adequate or the best generally approved constructions and precautions for preventing gases and other offensive currents, substances and smells from passing up or out through such connection from such sewer or passage; nor shall any such water-closet or privy be constructed without adequate provisions for the effectual and proper ventilation and cleansing thereof.

RULES AND REGULATIONS.

Ventilation of Rooms.—Every habitable room must have at least one window opening directly upon the street or yard, or upon a court or light-shaft.

Light and Air Shaft.—Every light and air shaft for habitable rooms must be at least twelve square feet in area for a three-story house, sixteen square feet in area for a four-story house, and twenty square feet in area for a five-story house; and in every case not less than two feet wide in the clear. Shafts between two houses and common to both must be of double this area and not less than four feet wide.

Where the sides of the shaft are allowed by the department of buildings to be constructed of studding, they shall be extended above the roof not less than three feet, be covered with glass to admit light, and be provided with openings protected by slats so arranged as to admit air, said openings to be at least equal in area to the area of the shaft.

Ventilation of Water-closets.—Water-closets shall not be ventilated by a shaft which ventilates habitable rooms; and where they do not open otherwise to the external air, they must be ventilated by means of a separate shaft not less than three square feet in area, to extend above the roof, and to be arranged for the admission of light and air at the top in like manner as the shafts for rooms.

Alterations and Additions.—No alteration in the light and ventilation of any buildings or approved plans shall be made, except upon the express written approval of the commissioner of health; nor shall any additional structure be erected upon the lot except upon such approval and a special permit:

Windows.—The windows of habitable rooms which open on shafts shall be hung with weights so as to slide vertically, each window to be not less than twelve square feet in area.

Drainage and Plumbing.—Sections 1360 to 1363, inclusive, of an ordinance for revising and consolidating the general ordinances of the city of Chicago, passed April 18, 1881, require that every house shall be provided with good and sufficient water-closets or privies, of a construction approved by the commissioner of health, and shall have proper doors, traps, soil-pans, and other suitable works and arrangements, so far as may be necessary to insure the efficient operation thereof.

Each and every house must make direct connection with the main sewer in the street. Under no circumstances will two or more houses be allowed to make such connection through one pipe, nor to carry their drainage in pipes laid beneath or through adjoining property.

The construction of private receiving-basins outside the lot lines, in the public streets, or inside the area of building walls, will not be permitted, except in such isolated instances where their location in the vaults beneath the sidewalks may be found to improve the sanitary surroundings, or assist the house drainage. In all other cases, they must be placed within the lines of the lots whose drainage they are intended to facilitate.

Privy vaults can only be connected with the sewers through intervening receiving basins, and the outlet pipes from all such vaults must not be less than three feet above their bottoms, so as to retain all solid matter, and effectually prevent anything but the liquid contents of the vaults from passing into the drainage pipes and receiving basins. All discharge pipes leading from kitchen sinks, or any other receptacles likely to contain grease in any form, shall make direct connection with and discharge their contents into receiving basins; and all bath-tubs, water closets, hand-basins, stationary washing tubs, etc., shall connect direct with the soil-pipe or main drain.

No sewer-pipe trap will be permitted to be placed at the foot of a ventilating shaft, waste or soil-pipe.

Certificate of Instructions.—When the work is completed and before it is covered from view, the department of health shall be notified that it may send its inspector, upon whose report the commissioner of health will act upon its final approval.

All material shall be of good quality and free from defects; the work shall be executed in a thorough and proper manner,

All plumbing in the house shall be so placed as to be readily inspected.

Every soil-pipe and waste-pipe of iron or lead shall extend through and at least four feet above the roof, of undiminished size, and provided with suitable top or cap

All house drains shall be provided with a proper trap near the street, and be provided with an inlet for fresh air, just inside the trap.

The house drain, if of iron, shall have a fall of at least half an inch to the foot. It should run along the cellar wall, and never be hidden under ground.

These iron pipes shall be sound, free from holes, and of a uniform thickness of not less than one eighth of an inch for a diameter of two, three or four inch, or 5-32 of an inch for a diameter of five or six inches. Before they are connected, they should be thoroughly coated inside and outside with coal-tar pitch, applied hot, or with some other equivalent substance.

All joints in soil-pipes and waste-pipes shall be so calked with lead, or with a cement made of iron filings and sal ammoniac, as to make them impermeable to gases.

House-drains, other than iron, should have twice the internal diameter and half the grade, except by special permission.

When a lead pipe or trap is connected with an iron pipe, the joint shall be made through a metalic sleeve or ferrule, and calked with lead.

Every sink, every basin, every water-closet and every tub or set of tubs shall be separately and properly trapped.

All traps should be ventilated by a special pipe extending above the roof.

Every "safe" under a basin, refrigerator or other fixture, shall be drained by a special pipe not directly connected with any waste-pipe, drain or sewer.

Every water-closet should be supplied with water from a special cistern, and not by direct connection with the city water supply.

No overflow-pipe from a cistern shall be directly connected with any soil-pipe, waste pipe or drain.

When the pressure of the city pumping works is not sufficient to supply the cistern, a pump should be provided.

No cistern for drinking water should be lined with lead.

Wrought-iron, steam-fitted, glazed pipes are the best for house-drains.

THE CHICAGO MASTER PLUMBERS.

At the last meeting of the Chicago master plumbers association the sanitary committee made a report in which they called the attention of the public to the necessity of looking to the condition of the cold-air ducts leading to furnaces. Care should be taken that these ducts are free from stagnant water and dead rats, and that there is a free communication to the outside air. The smoke-flues should be cleaned, and the fire-pots examined, as there should be no cracks permitting the escape of deleterious gases. The committee believed that many a sick-headache and dangerous case of illness could be traced to "quagmire" tunnels, through which pure air is believed to come into the dwelling. To prevent annoyance from wet ceilings, the conductor-heads should be cleaned out, and coarse salt sprinkled in them when snow falls and ice forms rather than chopping out obstructions. The committee recommended that now was the proper time (before the ground became frozen) to clean catch-basins, to save expense. It was advised, also, to look to the condition of shut-off rods, so that water could be immediately shut off on the bursting of a pipe.

A lengthy, but excellent, paper on "Plumbing of To-day as Compared With that of the Past" was read by Mr. David Whiteford. [Owing to the pressure on the columns of The Sanitary News the publication of this paper is deferred until a succeeding issue.]

A communication from Mr. O. F. Woodford, recent assessor of the water department, to Mr. Young, as president of the association, was read. He said: "I have been much interested in the rise and progress of the Chicago master plumbers association, and have watched its proceedings for indications of its actual progress in raising the standard of plumbing. I have long been sensible of the fact that in Chicago plumbing lacked a standard. That we have good workmen and capable, and disposed to do the best work at a fair recompense, has always been fully known, but the influences in operation connected with building have had much to do to vitiate and render inoperative the knowledge and skill of the plumber. The demand for cheap work and the lack of clear and definite specifications have placed the plumber at a great disadvantage. I do not, as yet, see that in your discussions you have alluded to the fact of specifications. Am I not right when I say that, in fact, you do not have anything that can be properly called a specification, and that but few, if any, architects in this city do or can write out a full and complete specification. such as will justify doing the best work and providing the best material and giving opportunity for full compensation for good work and skillful appliances? It seems to me that Chicago now demands and affords opportunity for the highest form of plumbing ability, inventive skill and patient fidelity."

Mr. D. Adler, of No. 1435 State street, was elected a member of the association.

SANITARY CONVENTION AT LONDON, ONTARIO.

The Sanitary News was recently gratified to see much interest taken in sanitary matters by the citizens of London. The convention was held under the auspices of the provincial board of health, aided by a local committee. The attendance was large after the first session which was in the morning following a heavy fall of snow. The chairman of the meeting was Alderman Cowen, also chairman of the local board of health. After an introductory address by Dr. F. Rae, of Oshawa, on behalf of the provincial board of health, a paper was read on public health, written by Dr. W. S. Harding, the quarantine officer at St. John, N. B., discussing the subject from a general standpoint. Prof. W. Saunders, of the Western university, of London, read a paper on the water supply of that city, illustrated by a miniature fountain constructed on the stage. The water is very clear, delightfully free from taste, and has only a slight amount of organic matter. The supply is from springs flowing from a depth of one hundred and twenty-feet, and is pumped into a reservoir of eleven thousand gallons capacity, and also directly into the mains. The daily supply is about four thousand gallons. In the afternoon, a paper was read by Judge Elliott, on insanity, touching the degree to which insane persons should be held responsible for criminal acts. Dr. J. L. Bray, of Chatham, Ont., read a paper on malaria, treating more especially of its appearance in winter, believing with Pettenkofer that ground-air and water were vehicles for the cause of the disease. Jno. K. Allen, of Chicago, read a short paper on the province of sanitary journalism treating the subject under the heads of its legitimate literature, its legitimate field, its supporters, what it has attained, its expectations and its rewards Prof. Waugh, of London, then read a paper on the results of the London, west, flood, which described the success the sanitary committee had in preventing disease in the flooded district. Dr. Edward Playter, of Toronto, read a paper on the typhoid plant, its nature and favorite soil, in which he stated that a microscopic vegetable germ was the cause of the disease. Illustrations were given showing how typhoid was generated by imperfect drainage and sewerage, allowing the spores of the typhoid plant to enter houses and attack the inhabitants. At the evening session there were papers on sewerage, local health organizations, and effects on public health of mill-dams. At the morning session on Saturday Prof. Saunders read an article on disinfectants, recommending chloride of lime, but adding that no disinfectant would take the place of cleanliness and fresh air. J. Dearness, inspector of schools for Middlesex county, read a paper on the hygienic condition of rural schools. The subject of hints on school hygiene was dealt with by G. W. Ross, of Strathroy, inspector of model schools of Ontario. Dr. C. T. Campbell, the secretary of the convention, read a paper on infectious diseases in school, and Dr. P. H. Bryce, secretary of the provincial board of health gave some reasons why so many persons die of consumption.

The American public health association was represented by ex-President Dr. Ezra M. Hunt, and the Michigan state board of health by Dr. Henry B. Baker, of Lansing, and Dr. Arthur Hazelwood, of Grand Rapids.

NOTES AND NEWS.

ANNOUNCEMENTS.

Dec. 5. Chicago, Ill. Regular meeting of Local Master Plumbers Association.

Dec. 6 and 7. At Trenton, N. J. Annual meeting New Jersey Sanitary Association.

Dec. 13. At Indianapolis, Ind. Regular meeting of the State Board of Health.

Dec. 13 and 14. At Ionia, Michigan. Sanitary Convention under the auspices of the State Board of Health.

Jan. 1. 1884. At Nashville, Tenn. Regular meeting of the State Board of Health.

Jan. 1. At Concord, N. H. Meeting of the State Board of Health.

Jan. 8. Lansing, Mich. Regular meeting of the State Board of Health.

MISCELLANEOUS.

Dr. C. R. Agnew will deliver a lecture on sanitary suggestions for the farmer before the Columbia veterinary college, on Dec. 10.

Dr. J. H. Kidder, U. S. N., reports an instance of defective plumbing detected in his own house. A portion of the ventilating pipe to the soil-pipe was omitted.

The house drainage in St. Petersburg hotels is uniformly bad.

Andrew Hickey, of Chicago, will do the plumbing in the new Lyceum theatre.

Dr. Geo. M. Sternberg, U. S. A., is about to publish a book on malaria, a subject upon which he is so well informed.

The surgeon general of the navy recommends that the medical departments of the naval powers of the world hold a conference, with a view to adopting a uniform nomenclature, classification, and tabulation of diseases.

The annual conversazione of the British architectural association, was held Oct. 26, in London, and was chiefly interesting because of the distribution of prizes to students who had excelled in the classes maintained by the association.

The Philadelphia Gas Trust Co. has contracted for 9,000 feet of 10-inch pipe from the Gloucester Iron Works of the same city, at sixty-five cents a foot.

Current Topics.

In spite of the opposition which The Sanitary News and all other journals interested in architecture have made to the competitive system of submitting plans for public structures, there are architects who will make such plans and lose time and energy, which might have been expended for a paying job. For instance, the directors of the world's industrial and cotton exposition, to be held in New Orleans in 1884, advertised for plans for an exposition building, based on certain figures as regards floor space and cost. To the unsuccessful submitters no fee or reward would come, save, perhaps, a paltry second and third premium. Ten plans were submitted. The one selected was designed by R. M. Torgenson, of Meridian, Miss. If the second and third premiums were awarded and paid, there are still seven architects who have no recourse but to chew the bitter cud of repentance, because of wasting weeks of time in an unsatisfactory manner. Now if the board of directors had done as they should have done, they would have employed an architect, and told him certain particulars which must be followed in the design, and allowed him to construct a design. They would then have obtained a satisfactory work, and the competitors of the present system, would not be out of pocket. The competition system is simply the result of an unjust desire to secure a choice from several designs, for the price of one.

At the sanitary convention held at Ionia, Mich., on December 13 and 14, the subject of ventilation was treated by Dr. J. H. Kellogg, of Battle Creek ; and the best method of disposing of the dead, by Dr. Frederick Gundrum, of Ionia ; contagious and infectious diseases, by Dr. John Avery, of Greenville. Dr. Arthur Hazlewood, of Grand Rapids, gave some hints on the care and preparation of food. Prof. F. S. Kedzie, of Lansing, read a paper on chemistry in its relations to domestic life. The questions of water-supply and sewerage, both important for Ionia, just contemplating as she is, the adoption of some system of each, were discussed.

A movement, looking to an additional supply of water for the city of Chicago, has been started in the common council. It is claimed that by operating both tunnels to their fullest capacity, only enough water is supplied for present use, and that it is almost impossible to stop the supply long enough to clean them. In 1882 the water receipts were $1,474,127.

From an interesting and exhaustive article on the amount of building in Chicago during the year 1883, which recently appeared in *The Tribune*, it is shown that 2,684 structures were erected, costing $15,648,700, and having a frontage of 77,797 feet. The majority of the buildings are, of course, of brick, but there are fewer stone fronts than usual, the pressed brick fronts being less expensive and fully as handsome. The most notable structures completed and under way during the year are the new board of trade building, the Farwell block, the first national bank, the Burlington railway block, the Ryerson building, the Calumet club house, the Royal insurance company's building, the Counselman building, the new open board of trade, the Pullman office building, the training school for boys, and the commercial national bank. There are many others which deserve mention. Using *The Tribune's* figures as a basis, it is found that in the number of buildings erected, the West division has more than twice either the North or South divisions. The same statement is true, and to a greater extent, as regards dwellings. In the whole city there were erected 2,150 dwellings at an expense of $7,853,650, being an average of over $3,600 each which certainly speaks well for the character of the buildings.

The same report has an interesting exhibit as regards flats. It shows that a total of 1,142 have been erected since January 1. This shows that the demand for flats is not so much lessened, as an opinion given a few months ago would seem to indicate. The Sanitary News then stated that the building permits at that time showed a falling off in the number of flats erected, and an increase in the number of cottage homes. At that time the statement was true, but taking the building permits at that time as an indication for the year would lead to error, as the permits, as a whole, show more flats erected since January 1, than in any previous year. The number of buildings denominated as "stores and dwellings," which are frequently flats in the upper stories, is also considerable, there having been erected 294, having 803 stories, showing the average hight to be a fraction over three stories. Even though builders construct flats, and continue to construct them throughout the coming year, it is a fact that they are not rented so easily as in previous years, and the rents are lower. In some of the most elegant apartment houses on the West side, there are rooms which have flaunted "to let" placards in the windows ever since completion, and the rents have dropped twelve and even twenty-five per cent. from original holdings. There are many small families and young married couples dragging out an unsatisfactory existence in boarding houses who would keep house if flats or apartments could be obtained in good condition and at prices ranging from $12 to $20. There are not enough small apartments, of three and four rooms, to supply the demand, while the five-to-eight-room flats are the ones which remain tenantless.

A very satisfactory thought, in connection with a review of the building operations of the year, is that this immense number of buildings has been constructed, under the watchful direction of the building and health departments. That it has been possible to prevent, in this large number, the erection of some bad buildings, will not probably be advanced by these departments, but The Sanitary News knows from absolute facts in its possession that many skin-builders and scamp-plumbers have had to do honest work or suffer the delays and annoyances of the law. Sometimes it has not been necessary to threaten with the law in order to have a correction of bad work made. In one instance an inspector, who had discovered a bad job, simply said to the man in charge of it that The Sanitary News was cognizant of the attempt to foist a poor job on the builder (which was a fact), and, if it was not corrected, the job would be shown up through its columns. The work was found to be correctly done at the next visit of the inspector. That people who rent have better and more healthy quarters by reason of the inspection of plumbing there is abundant reason for believing.

An accident resulting fatally to several persons occurred this month at a rendering factory in Chicago. The entrails and offal from a large meat-packing establishment were placed in large metal tanks, undergoing the process of being rendered into casings for sausages. The gases arising from the decomposition of the mass had collected until they were powerful enough to burst the tank, the shock also causing the explosion of a similar tank near by. The building was demolished and the workmen killed and injured. The cause of the disaster was clearly preventable. The criminal side of the story is found in the fact that the men employed in the factory, and presumably charged with the manipulation of these tanks, were ignorant foreigners. Whether they were intelligent enough to perform their work properly and prevent the collection of gases, seems to be a question, in the light of the result. There is good opportunity afforded by this occurrence to moralize and state that certain things "should not be." The employment of ignorant persons in places where they are not qualified is, perhaps, the worst feature. The use of machinery so constructed as to imprison foul gases, in a process which holds material until it is decomposed and putrid, and, finally, the making of casings of such material with which to cover sausages and other meats for human consumption, are all to be discountenanced.

The yellow-fever-stricken ship, Colima, was allowed to enter the harbor of San Francisco, unchallenged by the quarantine officers. Two sailors sick with the disease were sent, on false representations, to the marine hospital, where it was discovered that they were suffering from yellow fever. The people of San Francisco are justly indignant at the criminal carelessness which permitted the ship to enter the harbor.

Some time ago, mention was made in the building department of The Sanitary News of the organization of a stock company, which was to build apartment houses for bachelors. There is one such building projected, but it is of such a palatial character that, as a factor in solving the problem of homes for workingmen, it is of no account. It is to be built to accommodate rich bachelors, particularly members of the Calumet club. There will be three or four rooms in each apartment, and they will be leased furnished or unfurnished. Such a project will fulfil the demand which comes from millionaires, but for the bookkeepers and clerks, who could save money by renting a room in a clean, well-built, and healthy apartment house, and take his meals about town, a cheaper building is demanded. It is not a doubtful question as to the practicability or financial success of the scheme. Possibly some capitalist may interest himself in this phase of the "homes for workingmen" question.

In the course of a short address upon the occasion of the recent opening of the new North division high school building, the principal of the school, Mr. Henry H. Belfield, made the somewhat alarming statement that the building then opened was the first well-lighted school building in Chicago. Mr. Belfield has opportunities for determining such a question, and his statement may be taken as correct. The other schools must then be poorly lighted, which means myopic and other diseased eyes for the pupils. Undoubtedly, if a sanitary commission should inspect the Chicago schools, some grave unsanitary conditions would be found. A great deal of literature has been written upon school hygiene, perhaps more than upon any other branch of hygiene, yet there is less improvement in the sanitary condition of schools than in any other direction. It would seem that school boards, representing as they do, the educational interests of society, would be the first to adopt what educated people are almost uniformly adopting, that is, sanitary construction of buildings. There are more school-houses built than any other class of public buildings. The influence which school architecture has upon the minds of the children is very great. What a rare opportunity to impress upon children the correct principles of ventilation, and the proper area of lighting space to floor space. The proposition made by a recent writer to have a medical inspector of schools is a good one, but if he be a medical inspector of plans for schools, with enough engineering knowledge to enable him to tell in what particulars the plans are defective, and with power to have them drawn on correct principles, then he would be a useful public servant.

In Austria, a circular has been sent to eight thousand medical men asking for particulars as to cases pointing toward the contagiousness or heredity of consumption.

Architect J. O. Sedding, of the architectural association of England, in a recent speech, spoke as follows: "I cannot help thinking that the tendency of modern times will be to create a class of specialists in our profession. Take sanitary science, for example. We architects neglected it; a class of sanitary engineers arose and have taken a great deal of such work out of our hands. Had we not better try and get it back again? An architect should be better able to do such work, in so far as it relates to architecture, than an engineer; and there is, as far as I can see, no reason why he should not. Here is an opening for special study and profitable practice. A man who has made a specialty of sanitary science may collaborate with a brother professional who cannot, perhaps, give his attention and time to a subject demanding so much."

Mr. Sedding has so completely expressed the current view on this topic that it is scarcely worth the attempt to say anything more. His remarks apply, however, with the same force to American architects. But, while it may be said that American architects *did* neglect sanitary science, it cannot be so stated of them, as a profession, at the present time. Indeed, some of our most effective and practical sanitary work comes from the architectural profession. The architect has the opportunity to impress upon his client the necessity for a healthy home, and if he has the knowledge, as most thinking and reading architects of to-day, do have, he does not fail. Some of our large office buildings and larger mercantile buildings of to-day's construction will stand as models of properly-constructed, heated, lighted, ventilated and plumbed buildings. The builder has the money, and he wants the first equivalent for it. This equivalent is a large dividend on an investment in a building, pleasant, healthy and safe for its occupants. This the architect of to-day, can supply to him.

In a case brought before Judge Rogers, of Chicago, whereby damages were sought to be recovered from the city of Chicago and Dr. Hall (employed as a vaccinator by the health department), for sickness caused by vaccination, it is claimed with impure vaccine virus, the court held that the city could not be responsible for the misfeasance of employés of the health department.

The subject of homes for the poor is happily attracting much attention in this country and England. The Marquis of Salisbury has recently promulgated his views on the subject through the public press. Briefly, he would have parliament authorize loans to be negotiated through the Peabody trustees, to enable the dwellings of the poor to be repaired and maintained in good condition, security for the loan being either rates or taxes. He recommends suburban trains with weekly shilling tickets, as one method of depopulating London lodging-houses, and he would have the suburban builders placed under as strict surveillance as those in the metropolis.

There is, unmistakably, a growing sentiment in favor of the cremation of bodies dead from contagious diseases. One of the latest indications is a petition to the government by residents of Prince's Bay, S. I., asking for the cremation of the remains of persons who die of typhus fever, yellow fever, or cholera, claiming that they are not properly interred at the quarantine station.

A serious comment on the judiciousness shown by the national board of health in the management of its funds, is made by a daily paper, in a dispatch announcing the sale at auction of four barges and a steamboat hull at New Orleans last month for $900. These vessels formed a portion of the fleet turned over by the national board of health to the marine hospital service. The criticism is that they cost the board $100,000, three years ago, and "were never of any practical use." Some allowance must be made for the bias of the sender of the dispatch, who lives in a city, the majority of whose inhabitants were always opposed to the national board of health. The services which were performed by the particular barges and steamboat hull which were sold are not known, but The Sanitary News ventures the assertion from its knowledge of the national board as a board, and of its members as men, that the fleet they owned, if it did cost over $100,000, saved more than that sum of money to the commerce of the Mississippi Valley, by preventing an epidemic of yellow fever.

With the belief that a closer association of representatives of state boards of health than is had in the American public health association was desirable, the initial movement toward forming such an association was made at Detroit last month. It was decided to call a meeting of secretaries or other representatives of the various state boards, at Washington in May, 1884, to organize a section of the American association devoted to state boards, or a separate society, as would then seem best.

From the approaching congress, the friends of the national board of health will ask sufficient and adequate appropriations to enable it to maintain a bureau of scientific investigation, which will prove itself as valuable to this country, as the German and French nations are finding their cholera commissions to be to them and the whole world. With the knowledge that such appropriations will be asked, the enemies of the board are endeavoring, by just such comments as those mentioned above, to create a feeling against appropriations, in the hope of again defeating the reorganization of the board. Consequently, such statements must be taken with a due regard to the purposes for which they are made.

A reported excessive death-rate in Guayaquil, Ecuador, led The Sanitary News to make inquiry of Hon. Horatio N. Beach, United States consul at that place, as to the facts; he was also requested to give a brief account of the sanitary condition of the town, and any information that might show a possible relation of cause and effect. Mr. Beach very kindly and promptly answered the inquiry. His communication is published in another column of The Sanitary News. Astounding as it may seem, the fact appears to be that the annual death-rate is little less than 122 per thousand of the population. "The principal diseases are fevers and dysentery, traceable to the cause stated," says Mr. Beach. The "cause," in brief, as he concludes without qualification, is found in the fact that the city has "no public sewers, no house plumbing, and no water-closets." The solid wastes of human existence are received into open barrels, presumably left standing at the door-step, or possibly within the building walls themselves, liberating poisonous gases and breeding "germs" of disease, until these improvised receptacles are full; they are then in an apparently matter-of-fact manner emptied into the river. Less trouble is taken with the liquid wastes, as they are simply thrown out upon the ground to be evaporated in the warm atmosphere,—they do not soak into the ground, to any appreciable extent, the soil being similar to that in and around Chicago, capable of holding water about as well as a cemented cistern. If anybody can conceive of anything more conducive to ill-health, let him speak. There need be no wonder that the death-rate in the city of "ancient" ideas, on the South American Pacific coast, has a death-rate every month almost as large as the annual death-rate of some of the well-sewered cities of this country. An innate disregard of cleanliness is not to be charged with the filthy habits of these people, but rather an ignorance of sanitary laws and a foolish reverence for custom, which prevent the introduction and use of the improved methods of disposing of that which has become waste. Let the municipality set the example, and the people will, individually, become neat in their habits. It is a noticeable fact that, in Guayaquil, after infants, the deaths are mainly among "those living dirtily in dirty places." One need not go to Ecuador to find this true. In Chicago, the highest mortality is in those wards which have the least, or poorest, sewerage, and in which the people, both because they are compelled to, and because they catch the spirit of negligence from the city, are careless as to the disposal of offensive and injurious waste, and are filthy in personal habits. Mr. Beach believes that the climate has been wrongly charged with much of the sickness and mortality of the country with which he has become pretty familiar, and that Guayaquil might be made one of the most healthy cities in the world.

CHICAGO SEWERAGE—DISPOSAL OF DEPOSITS.

XVI.

The solid deposits in the sewers and catch-basins are removed by means of shovels, hoes, scrapers, barrows, etc., and usually hauled away by wagons. It has been a frequent custom for laborers to throw this offensive matter directly out upon the streets, in low places, which have not been paved, or into vacant lots. The argument is that filling is needed, and this is thus secured in an inexpensive way. No space need be occupied in condemning the practice, from a sanitary stand-point; but it may be stated that the city has tolerated it, if not approved of it, to a really alarming extent. Very much of the sickness in the city can undoubtedly be traced to houses which have been built on ground made of sewer deposits and street sweepings. A simple yet practical illustration of the effects of this "filling in" with such material came to the notice of The Sanitary News a few days ago. A woman on the West Side spread a clean garment —a dress just washed—on the surface of the ground in the yard back of her house, to dry. Soon after, it began to snow; the garment was covered and forgotten until spring. It was then carried into the house, still frozen, and the process of thawing out begun. In a very short time it gave off an abominable odor, worse than that of the river, when its sewer odors are most pronounced, which finally became unendurable; the garment was at once consigned to the alley. It had undoubtedly absorbed the gases generated by the "filled-in" earth, during the winter. Houses not only receive these gases when built upon such ground, but act as suction-pumps to draw them out.

The superintendent of sewers said, in his annual report for 1881: "The question of cleansing the general sewerage system of this city is one upon which I have bestowed considerable thought for the past two years, and while I am inclined to concede room for improvement in some of the minor details, taken as a whole I have grave doubts if it can be very greatly bettered without the expenditure of more money than a wise economy would sanction, or the city government has at its disposal to lay out. The mere question of flushing out or cleansing the sewers themselves is not the all absorbing one with us in this direction, neither is it, under certain conditions, the most costly; another and an equally expensive portion of the work, and the one that will continue to increase directly as the extension of urban improvements, is the handling and disposal of the solid deposit removed from out the general system, but the major portion of which comes from the catch-basins, the distance which we are frequently compelled to haul this black filth in order to reach a safe 'dumping-ground' being often as great as six miles, and in instances not rare, even more. Here the controlling and the necessarily expensive elements are the number of teams that are required to do the work with the requisite rapidity, and the prices paid per team with its driver and two wagons, because the number of loads handled per diem by each team do not exceed two, under any condition of things. In my opinion the day is not far distant when it will be found necessary, and probably more economical, to resort to the use of scows holding from two to five hundred cubic yards each, and which have been especially designed and constructed for such service, moored at easily accessible points along the river, and which, when loaded, can be towed out into the lake and dumped at points some ten miles or thereabouts off shore. For some years past it has been the practice to scatter the filthy deposits removed from out the catch-basins over the surface of the near-by streets, where unpaved or otherwise unimproved, for the purpose of saving the cost of hauling, but aside from the not unreasonable objections of many of the citizens themselves to this exceedingly reprehensible way of doing things, it is open to the gravest objections in a sanitary point of view, compared with which the question of mere economy approaches insignificance."

As the streets become paved there seems to be less of this indifference in scattering sewer deposits in the most convenient places, notwithstanding the practice would be less deserving of condemnation; under such circumstances the waste would sooner or later be hauled away. But there are many miles of streets in Chicago not yet paved, in which there are sewers, and the corner lots and streets themselves are being gradually filled with dèbris and refuse taken from the catch-basins and sewers. The expense of cleaning the sewers and catch-basins in the city last year was $33,969.35; for the year previous it was $34,502.15.

The following tabular statement shows the length and interior diameters of main, sub-main and lateral sewers, comprising the primary drainage system of the city of Chicago, by wards, as it existed on December 31, 1882:

WARDS.	9 Feet.	8 Feet.	7 Feet.	6½ Feet.	6 Feet.	5½ Feet.	5 Feet.	4½ Feet.	4 Feet.	3½ Feet.	3¼ Feet.	3 Feet.	2½ Feet.	2¼ Feet.	2 Feet.	20 Ins.	18 Ins.	15 Ins.	12 Ins.	Total in Feet.
1st	----	-- -	----	----	-----	----	-----	-----	1,926	-----	----	8,470	12,960	4,286	13,135	----	-----	1,870	46,862	89,509
2d	----	----	----	----	-----	----	494	-----	-----	-----	----	5,260	6,965	2,073	11,036	----	-----	------	28,974	54,802
3d	----	----	----	----	1,480	----	4,008	---	656	-----	---	1,485	16,095	----	20,340	----	619	864	29,915	75,462
4th	----	----	----	---	704	----	1,058	1,261	1,745	916	----	4,685	30,547	----	43,027	----	5,853	7,189	50,847	147,832
5th	----	----	----	----	1,034	----	6,697	5,767	7,000	3,285	----	15,547	12,615	----	55,705	1,625	8,880	13,839	61,697	193,691
6th	5,450	2,493	1,462	1,380	2,322	4,414	3,303	12,105	12,397	5,690	----	3,193	3,855	----	26,705	----	-----	17,707	42,098	144,274
7th	----	----	----	----	-----	----	5,845	1,919	10,443	6,685	----	8,045	3,220	----	29,195	----	-----	14,874	46,671	128,792
8th	----	----	----	----	-----	----	9,305	10,675	6,320	-----	----	1,175	630	----	37,445	----	-----	------	35,729	101,323
9th	----	----	----	----	-----	----	9,027	4,198	-----	-----	---	-----	------	----	24,475	----	-----	------	26,185	63,883
10th	----	----	----	----	1,296	----	6,648	3,911	3,375	-----	---	-----	------	----	28,810	----	-----	------	18,388	62,428
11th	----	----	----	----	-----	----	----	19,019	3,684	-----	---	705	630	----	31,428	----	999	2,277	37,277	96,019
12th	----	----	---	----	-----	----	-----	-----	14,686	12,133	---	11,796	10,240	----	48,245	----	7,662	19,655	60,903	185,320
13th	----	----	----	----	-----	----	----	-----	11,650	5,189	332	4,623	2,566	----	20,068	----	1,358	6,443	43,044	95,273
14th	----	----	----	----	3,006	1,346	12,729	9,384	8,368	516	333	5,230	4,281	----	56,140	----	3,465	23,309	64,434	192,541
15th	----	----	----	----	-----	----	-----	4,485	5,510	3,759	---	3,508	16,670	----	32,420	----	2,914	10,152	60,917	140,335
16th	----	----	----	----	-----	----	2,765	1,233	660	-----	----	2,354	9,029	----	24,164	----	-----	355	31,856	72,416
17th	----	----	----	----	358	----	5,583	-----	252	-----	----	1,962	3,763	----	22,758	----	-----	846	29,133	64,665
18th	----	----	----	----	3,696	----	5,537	2,615	5,496	-----	----	3,867	586	----	41,987	----	-----	2,642	36,299	102,725
Totals	5,450	2,493	1,462	1,380	13,896	5,460	72,999	76,572	94,168	38,173	665	81,905	134,652	6,359	567,083	1,625	31,750	123,104	752,084	2,011,280

ESSENTIAL FEATURES OF HOUSE DRAINAGE.—III.

BY RUDOLPH HERING, C. E.

It is quite objectionable to ventilate any trap or fixture into chimneys, under the supposition that there will always be an upcast in the same. In summer there is generally a down-cast in certain chimneys protected from the heat of the sun, in which case the sewer air would enter the room.

Before leaving the subject of traps a few of the principal styles should be mentioned. In a perfect system of house-drainage, all traps should have a depth of seal in proportion to their liability to siphonage, a question which can be determined in each case, and varies from 1½ to 3 inches. Among all the many styles of traps, those consisting merely of a bent pipe, and having the same water section at every point, are the best, for they permit the quickest flow and the least possible retention of matter. At the same time they are the most readily siphoned and should have separate ventilation in almost every case. The desire to prevent siphonage has brought about many devices more or less complicated. I shall only refer to a few of the most common, which I have sketched in the accompanying chart.

The so-called D trap and the bottle trap are objectionable on account of offering a good chance for deposit, as shown. The latter has the advantage, however, that it is hard to siphon when kept clean. When given a rounded bottom, as shown in the sketch, it is less apt to store deposit.

Bower's trap, where a floating rubber ball serves to close tightly against the receiving pipe, is a better device, but it also needs occasional cleaning. Its resistance against siphonage is not complete, and it requires ventilation where exposed to considerable suction.

Cudell's trap operates on a similar principle, but a metal ball is used instead of a rubber one. It is more readily siphoned than Bower's trap.

A better anti-siphonage device however is Nicholson's trap, as it effectually maintains the seal, by means of a small quantity of mercury, even after all the water has been sucked away. Its expense is unfortunately too great to allow of an extensive application.

The Bell trap used for yard sinks is one of the most common, but also one of the worst, contrivances in use. It readily fills with deposit, maintains, at best, a shallow seal, which in summer evaporates and in winter freezes up. When it is cleaned by removing the bell, the seal moreover is completely broken. A deep trap should always be used in preference.

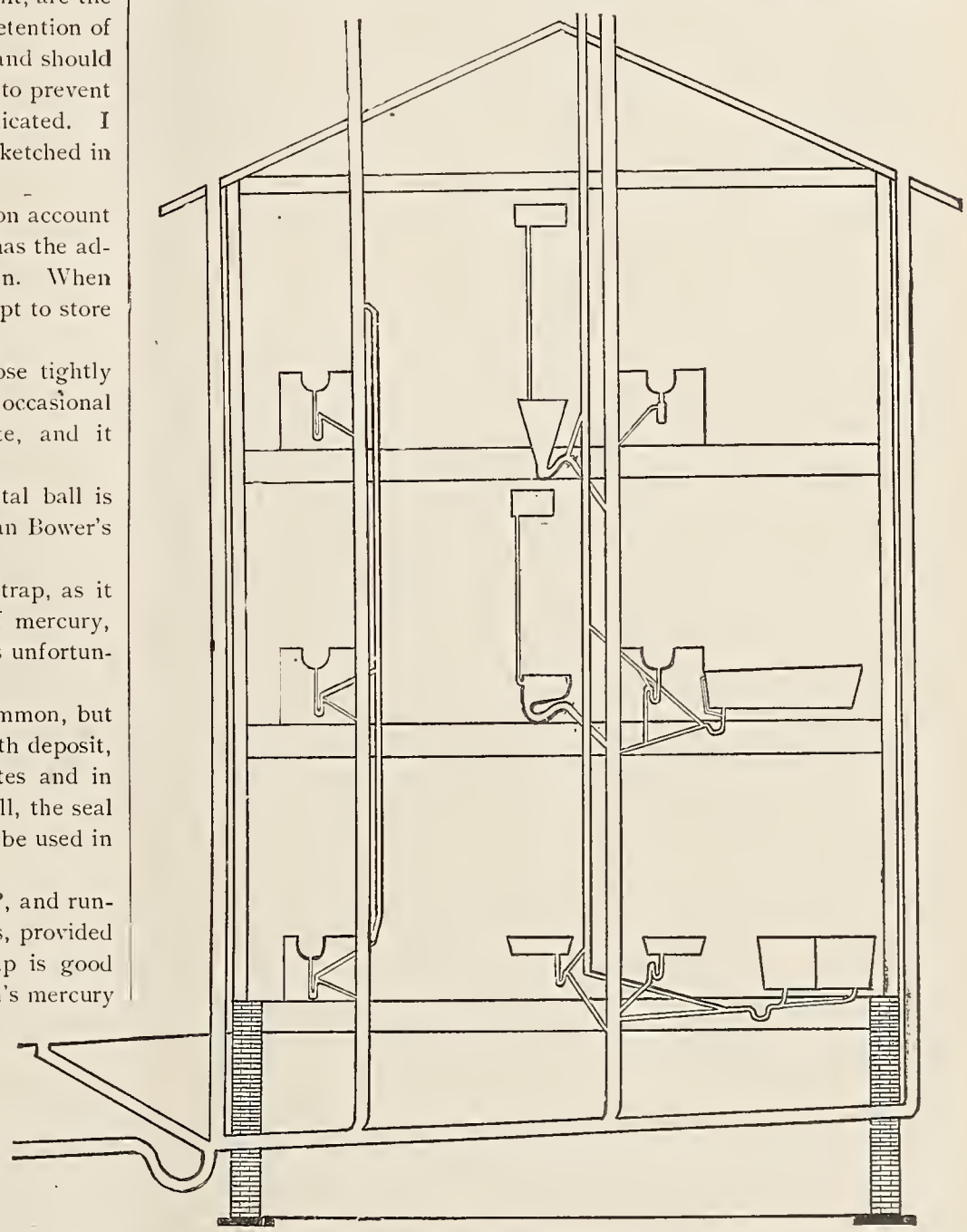
To recapitulate, I consider the siphon traps, viz., the S, P, and running traps decidedly to be the best under all circumstances, provided they are properly vented. Without ventilation, Bower's trap is good where only a slight tendency exists to siphonage and Nicholson's mercury trap where there is a strong tendency.

III.—Discharge Pipes.—We have now considered the principal and necessary features, first, of all the receptacles for sewage, and then of the traps which protect them from the back flow of sewer air. The next question refers to the proper arrangement of the pipes which receive and carry away from the premises all the discharges of the receptacles, after they have passed the traps.

These pipes necessarily contain more foul air and foul matter than the fixtures, and any fault in the arrangement or in the execution is likely to be fraught with more dangerous consequences.

In the first place, it is therefore advisable to maintain as much simplicity as possible, and therefore to have as few pipes as is consistent with safety. The receptacles on each floor should be concentrated at one or a few points, and be placed directly over each other in different floors, so that horizontal pipes running between or across the floor-beams are avoided. The comparatively small size of the pipes necessary in a building requires them to have a very good grade if they are to work satisfactorily, and this cannot be given them in the small space between the floor boards and ceiling laths.

Usually, it suffices to have one soil-pipe for a building, and one or two waste-pipes connecting the wash-basins, bath-tubs, etc. In England, the common practice is to run the soil-pipes down on the outside of the house, as they are considered more dangerous than common waste-pipes, which are kept inside. In the colder countries of the continent, however, the soil-pipe is also inside in order to be protected against the action of frost. In our climate, we are likewise obliged to keep all pipes except rain-leaders inside of the walls. We also do not hold the English idea that waste-pipes from wash-basins, bath-tubs, etc., should not discharge into the soil-pipes, for we say that if the waste-pipes are well jointed and trapped against the escape of any interior air, which may be just as dangerous as the air in the soil-pipe when the bath and laundry water from a diseased person enters them, then there is no reason for any distinction. Waste-pipes should have exactly the same treatment as soil-pipes. All vertical pipes descending from the receptacles terminate in the main drain, which extends from the furtherest pipe to the point of discharge or outfall. They should be placed on the inside of the wall of the house, and if they are boxed, it should be done in such a manner as to permit ready examination when necessary. The main drain is likewise best placed where it can be seen and where any defects can at once be discovered. It should therefore be run along the cellar wall and suspended or supported by brackets. If carried under the cellar floor, it should lie in a brick or stone trough, closed with removable covers, to permit examination.



A Type for House Drainage.

The main requirements of discharge pipes, are that they carry away the waste matter as thoroughly as possible, without a cessation of flow or eddy, and that they are thoroughly ventilated. To accomplish this end we must first inquire into their proper size. When water having matter in suspension half fills a pipe, it will be evident to every one that its momentum or force to carry such matter along is greater than when the stream is comparatively shallow and meanders along the bottom of the pipe. Therefore, the latter must not be larger than necessary, for if it is, the stream becomes shallow, it cannot keep the pipes as well flushed, and deposits will occur and accumulate. The foulness of an innumerable quantity of house drains and street sewers is due mainly to the oversight of this important fact.

The quantity of water used in an ordinary house, and which is often supplied by a service-pipe only one inch in diameter, even when concentrated by the flush of a water-closet or tank, and augmented by the roof water from a heavy rain, cannot more than fill a four-inch pipe laid at a good grade. It has therefore been urged that no greater size should be used. Many houses, especially in our country, have been supplied, within the last few years, with no larger main drains. While the above theoretical reasoning is quite correct, and while it is true that with proper strainers and with a water-closet trap only three inches in diameter no substances ought to enter a four-inch pipe that would not pass through it, experience proves that, practically, four-inch main drains do become stopped up in a greater proportion than ought reasonably to be expected. No doubt in cases, where the main pipes have a very good descent, say 1 in 5, where they get a regular cleansing from closets having a large tank flush, and where all the receptacles are carefully used and for no other purpose than that for which they are intended, it may never happen that a four-inch pipe fails a single time. But to establish this size for all buildings of a town must result, to say the least, in much inconvenience. In Memphis, where the house-drains are limited in size to four inches, about one stoppage a day is reported.

It is said that a trouble occurring on one's own premises is clearly due to one's negligence and the penalty is placed where it belongs. The obstructing matter is prevented from reaching a street sewer where it might possibly cause an injury to many. This argument is apparently good. But, if we look upon sewers and drains as being placed in streets and houses for the purpose of offering the greatest possible convenience to householders consistent with a fair operation of the whole system ; if we find in practice that a slight increase in size to five or six inches gives a far greater immunity against stoppages, without increasing those in the main drains, then we must be compelled to acknowledge that the rigid theory should be modified in practice. In England, long experience has decided against such small main house drains. In Germany, it is considered unwise to reduce the pipes less than six inches. My own experience has also convinced me that for a city in general, main drains should not be limited to less than five or six inches. For ordinary dwelling houses, if the pipes are laid evenly and the joints are carefully made, they need not be over five inches ; if any sticks, bottles, forks or other long articles, ever get into the pipe through any of the traps or strainers, they are much less apt to get stuck than in a four-inch pipe. The question is, of course, very little affected by so trifling a difference of size, and the house-owners, as a rule, prefer to pay for still larger sizes, thinking they will be more efficient.

The vertical soil-pipes need never exceed four inches in diameter, except in very high buildings. Soil-pipes draining as many as six closets have been even successfully used with a diameter of only three inches. Waste-pipes should generally be from 1¼ to 2 inches diameter ; those from a single wash-basin should be 1¼ inches in diameter ; from baths, kitchen-sinks and wash-tubs, 1½ inches ; from slop-sinks 1¾ inches ; smaller pipes should never be used.

The second important consideration in designing the system of house-pipes is to give them an alignment so that that the water entering them will meet with no serious obstructions. For this purpose, all pipes should be as nearly straight as possible. The vertical pipes should enter those lying nearly horizontal by means of a bend which turns the stream gradually into the latter and prevents the resistance and deposits caused by the sudden check of flow. Pipes that are nearly horizontal can, however, deliver into vertical pipes just as freely without a bend. Offsets should be avoided as they obstruct the passage of both water and air.

The grade of the pipes should always be as great and as uniform as possible. The velocity of the sewage produced by it ought to be at least two feet per second, if the pipes are to be self-cleansing. Generally, however, it is desirable to give the grades a minimum pitch of one foot in fifty feet.

A third consideration is the securing of a free flow of air through all the pipes, not only to follow every sudden flush of water flowing down them and to clear the way before it, so that no traps may be unsealed, but also to provide them with a continual fresh supply of oxygen for purifying the foul matter which may have adhered to the sides. Among all of the principles to be considered in devising a proper house-drainage, this one of ventilation is most frequently ignored. Usually, no ventilation whatever is provided for the pipes, and in many cases we find one opening only obtained by carrying the pipe above the roof. A little reflection would show that, to establish a current of air in a pipe, two openings must be given, one for the air to enter, and one for it to escape, and to the neglect of this, no doubt, much of the troubles arising from the escape of sewer air into the rooms is due.

All authorities agree on this point, and insist on the discharge-pipes being open both at the top and at the bottom for the above reasons. The pipes must, for this purpose, be extended a few feet above the roof. They should not be covered with any cap or cowl, except perhaps a wire-basket, where leaves or sticks might get into the pipe, because all such obstructions only impair the ingress or egress of air, without doing any good. A better current can always be produced in them by increasing the diameter above the roof, and this is to be recommended principally for all the smaller waste-pipes, as the friction of air is comparatively much greater in them.

The bottom of the house-pipe, *i. e.*, the lower end of the system, should also be opened, and, as there is an occassional expulsion of drain air from it, be located away from the windows. These lower openings are called fresh-air inlets, because most of the time they supply air to satisfy an upward current in the warmer pipes. In cities they should be placed at the curb line and covered with a grating. The constant circulation of fresh air through the house-pipes keeps them comparatively clean and the air expelled occasionally is not found offensive.

WATER-CLOSETS.—V.

French Patent Law began 1791. Between 1794 and 1800 (the date which we have assumed as the date for ancient closets to merge into modern closets) the French government issued one patent for a water-closet to De Cœur, January 5, 1796.

There was no patent issued for water-closets in America until 1833 and 1835, and those were issues for portable water-closets or commodes.

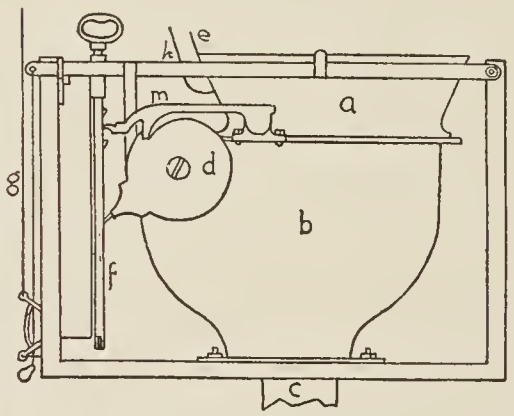


Fig. 27.—Law's Closet.

a, Bowl. *b*, Receiver or cesspool. *c*, Soil-pipe, *d*, Ratchet. *e*, Supply. *f*, Pull-rod. *g*, Wire to tank. *m*, Catch.

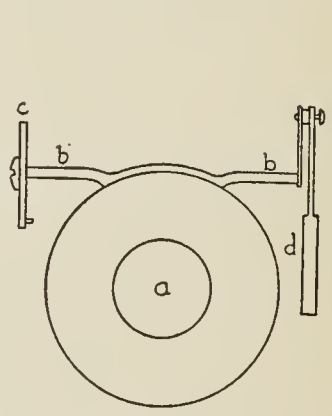
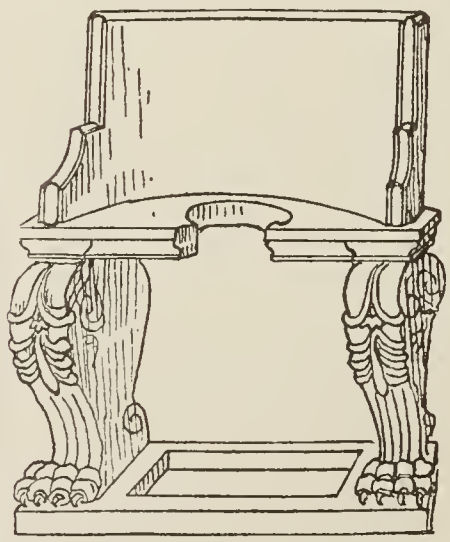


Fig. 28.—Details of the Pan.

a, Pan-valve. *b*, Axis. *c*, Ratchet. *d*, Weight.

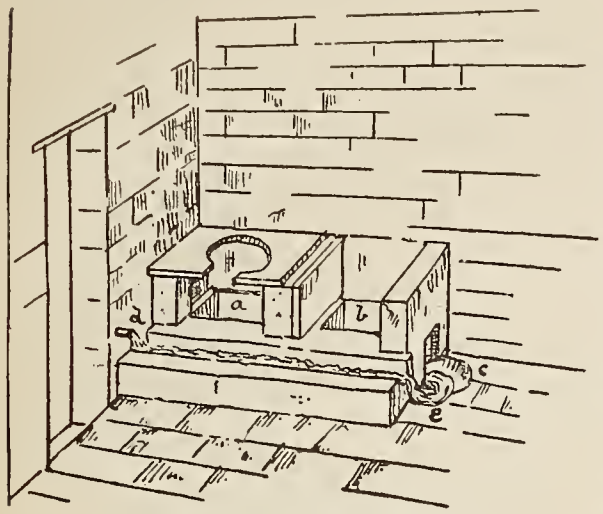
Reviewing contemporaneous literature we find that water-closets before the nineteenth century were not considered a part of the plumbers' work. There is no mention of water-closets in "Art du Plombier," by C. M. de Gardette, an exhaustive work on the subject (1761–1779), while we find a description of the one described above in "L'Art Menuisier," by A. J. Roubo. S. S. Hellyer tells us that he could find no mention of them in the "Art of Building," published in London, 1734, or in Campbell's "Compendious View of All the Trades Practiced in the Cities of London and Westminister," published in 1747.



A point which strikes us as curious is that we do not find mentioned, or shown, among the earliest closets, the simplest form of hopper closet. Was it because hopper closets were not in use at this early date, or because they were considered too simple to put on record ?

By a careful review of the subject from 1800 to the present time, which we hope to make public at some future date, we have formed the opinion that a simple short hopper closet is the best in use, when prop-

erly connected with a tank and flushed by water from the same (through a flushing rim), having its trap vented and its bowl ventilated in the proper manner.

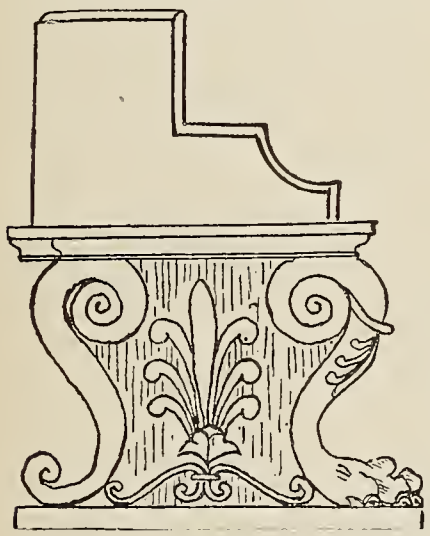


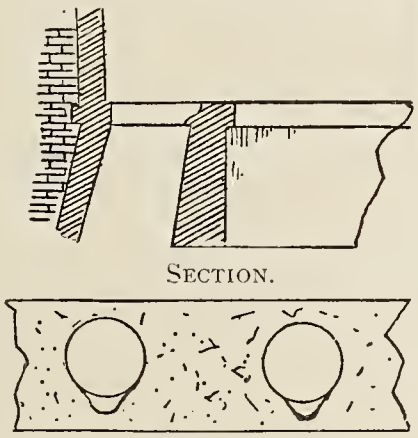
WATER-CLOSET IN POMPEII.

a, Seat for sitting on. *b*, Place for crouching. *c*, Urinal. *d*, Water-pipe. *e*, Stream running in urinal.

F. Liger, in his work on this subject, informs us that the remains of three privies were found in the ruins of Acteon's house, Pompeii. One was situated against the wall on the alley, another under the the steps, and the third was in the kitchen. The first was the only one that received light from the outside. Remains of privies (latrines) are still found in Lucretius' house, placed in a narrow closet.

A drawing by Piranesi represents a water-closet (*sterquilinium*) from the same town. There are three compartments placed in a large chamber, one of which has a seat; the other seems intended for use after the manner of Orientals (by squatting), while the third was evidently used as a urinal. The water is admitted by a pipe which runs through the wall; thence it flows in front of the seats through a gutter, falling into the urinal from a higher level, where it turns and runs under the closet seats, carrying away any fæcal and other excrementitious matter. This was probably a cleanly arrangement, when we take into consideration the fact that the Romans cleaned off all sediment or other particles which adhered to the surface with a sponge or mop fixed on the end of a stick. In the work entitled "Le Case et i Monumenti" are mentioned remains





SECTION.

PLAN.

Privy from the Palace of Serapis, Puozzoli.

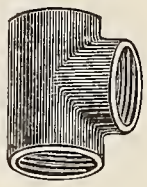
of privies which were found in the house of Marco Lucretio. In these rooms remains or indications of tiling were found, and obscene figures pointedly drawn. Cochin and Belicard, in "Les Antiquities d' Herculaneum," mention and illustrate several seats with holes which were found in the palace of Serapis (1750), Puozzoli. Public latrines among the Romans had no seats, they being in the habit of crouching like the Orientals. In private houses marble seats were usually used; but in some cases the choice of arrangements was given them, both kinds, with or without seats being placed in the same room. In Constantine's time (300 A. D.) and probably at an earlier date, seats in the shape of chairs, with backs and arms and elaborately carved legs and feet, were used for this purpose. A fine example was in the Louvre some years ago, which is supposed to have dated back to Constantine's reign.

THE MANUFACTURE OF SANITARY APPLIANCES.—III.

MALLEABLE IRON CASTINGS.

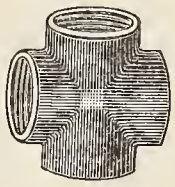
Up to the point of malleableizing iron fittings, the process of their manufacture differs in no particular from that of ordinary cast-iron fittings, described in the last issue of THE SANITARY NEWS. The process of malleableizing is an interesting one, both from the results obtained, and the method of their attainment. As is well known, the process is designed to toughen the fitting that it may be pounded, or roughly handled without so great a risk of its breaking. This process of toughening is due to a chemical change in the constitution of the metal and may be described as follows:

The castings are packed as closely as possible in an iron box and are thoroughly filled and packed with "iron scale" (refuse iron dust) and placed in a furnace. The furnace burns coke and the flame is directed over, under, and around the cases of castings. The temperature is maintained at an excessive heat, and the furnace is kept fired for seven days. At the end of that time the furnace is allowed to cool. After forty-eight hour's cooling, one end of the furnace is taken down and the cases of castings are removed by an ingenious grappling truck, for the temperature is still too high to admit of a man's remaining in the furnace longer than the moment required to adjust the grapple. The cases are then knocked apart and the castings allowed to cool upon the ground floor.



TEE.

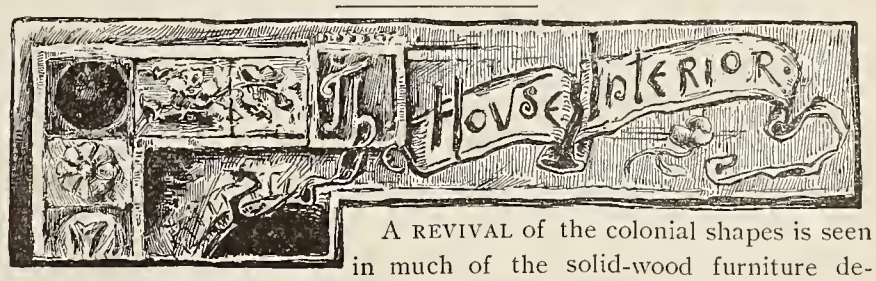
When thoroughly cooled they are cleaned in the revolving cylinders, the same as other castings. Before being threaded or rimmed, they are shaped by heavy blows on the casting, while covering a perfectly-round rod of iron. The casting then follows the course



CROSS-TEE.

of ordinary cast-iron fittings through the various processes of cutting, threading, rimming, and trimming, as described in the last article.

In cast-iron fittings it is usual to cast a shoulder for the purpose of adding strength. Malleable-iron castings are often made without these shoulders, as shown in the above illustrations of a tee and a cross.



A REVIVAL of the colonial shapes is seen in much of the solid-wood furniture designed for hall and library uses. The early settlers of New York and New England had some well-defined opinions regarding stability and comfort, and while giving little thought to mere ornament, they produced solid, consistent pieces of furniture whose simplicity of form and outline is seldom ungraceful. A return to these shapes in polished hardwood is one of the fashions of the day, and will be in the interest of both beauty and economy, provided people are willing to give these and other genuine, honest furnishings a permanent place in their households, and not discard them for the next passing fashion. Chairs, tables, hall-seats and chests of solid mahogany, oak and cherry are found in excellent shapes, and grow richer and more valuable with every year of use. They are easily taken care of, and the settees and chairs can be made as comfortable as possible with plush or velours cushions. Some little corner tables are attractively odd in design, and desks and side boards of carved mahogany with brass handles and clawfeet are exact reproductions of the last century's shapes. These articles are too convenient and durable to be cast aside for a freak of fashion, and if they are to join the procession of household furnishings which, in many houses, is constantly moving from parlor to garret, they may as well be made of the stained or painted pine, with flimsy machine-made ornaments, which has been so largely used during the last twenty years.

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THE recent interest in old furniture, and the very general adoption of mediæval and early English shapes in the houses furnished within the last few years, have produced a very heterogeneous effect, and have turned many drawing-rooms from comfortable, homelike apartments into curiosity-shops, where half a dozen centuries jostle and elbow each other in ill-assorted companionship. A gilded spinning-wheel in a modern parlor is one of the most glaring of these absurdities. China plates, however rare and costly they may be, are wholly out of place in plush frames, or hung upon the wall as if they were pictures. An able writer on decorative art says: "Often in the present enthusiasm for the things and manners of old times, people are apt to be carried away, and, out of disgust at the falseness and artificiality of later civilization, forget the good things it has brought as well. At any rate, we cannot return in any genuine sense to primitive ways, nor should we try to do so; only, by discovering the mistakes over-sophistication and refinement have led us into by comparison with the simpler old fashion, we may correct them, not losing what we have gained, but merely putting it to a better use."

Cretonnes are growing in favor for hangings and furniture-coverings, and, in texture, design and colorings, they were never better than at present. The French fabrics are close and soft, both in the corded and crape surfaces. Some reproductions of Gobelins designs in dull colors are admirable. their scrolls, arabesques and conventionalized flowers being well combined, and set against dull red or olive backgrounds. In the crape cretonnes natural floral forms are largely employed, and they have a velvety richness and softness, which make them quite as effective for upholstery uses as many of the more costly fabrics. Chintzes are better in design and color than ever, showing natural flower forms carefully carried out on the glazed satin-like surface. These cotton materials are far better for bedroom furnishings than any silk or wool fabrics, as they are easily kept clean, and their moderate cost renders a frequent change possible. The better qualities will bear the sunlight, which should never be shut out of a bedroom, with so little change of color that two year's wear will not seriously deface them.

* * *

With the approaching holiday season begins the search for small decorative articles and ornaments for mantel and cabinet, which constitute such a large proportion of the Christmas gifts. The demand for these trifles has filled the shops with cheap pretentious imitations, whose seemingly low price is often a temptation to those who know and appreciate genuine and artistic bric-a brac. Among the most satisfactory holiday fancies are the inkstands, trays and candlesticks of beaten or perforated brass. They can be found in good shapes and are strong, pleasing and durable. Some vases and jugs in clear and colored crystals are beautiful in form and tint, and an odd bit of china or pottery, if well-chosen, is always an acceptable gift. The popularity of the colored Bisque figures seems to be declining, the great number of poor pieces, and the many reproductions of some of the best designs making them undesirable. It should be remembered that one good piece, either in metal, crystal or ware, artistic in design, and not too frequently duplicated, and with, at least, some possibilities for use and fitness in the place for which it is intended, is worth any number of trumpery and meaningless ornaments whose possession soon becomes a vexation of spirit to any but an ignorant owner.

* * *

Some elaborate decorations for rich hangings are shown in floral designs in plush appliqué. A portiere of olive plush has a broad band of a lighter shade with large passion flowers and palm leaves in the natural colors. A cover for a small square table is of peacock blue plush, each side being cut into a deep scallop which is ornamented with pink roses of plush, stuffed, so as to stand out well from the background.

Martha Howe-Davidson.

THE CHICAGO MASTER PLUMBERS.

The Chicago master plumbers' association held a regular meeting on the evening of Dec. 5, at which President Young read a letter from Robert Brown & Sons, of Paisley, Scotland, announcing the shipment of three crates of plumber's goods. These are contributed by the firm named to the association, and include a large list of all kinds of water-closets, etc. A committee consisting of Messrs. Murray, Wade and Young was appointed to draft resolutions thanking the firm for the donation. The association is already looking for suitable rooms where these articles may be put on exhibition for the benefit of plumbers and the general public.

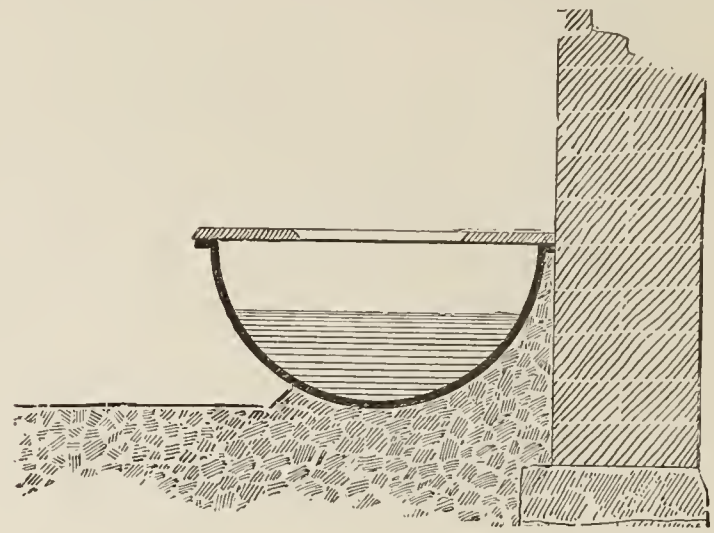
It was announced that Dr. Oscar C. DeWolf, commissioner of health, would lecture before the association at its next regular meeting, Dec. 19, at the rooms used by the association—Grand Army hall, on Washington street. Arrangements were made for a lunch and musical entertainment to follow the lecture.

No paper having been prepared to read before the association, the remainder of the evening was spent in discussing the constitution of the national association, which was adopted. As prepared and printed it will be sent out to the other plumbers' associations in the country.

SCHOOL-HOUSE PRIVIES.

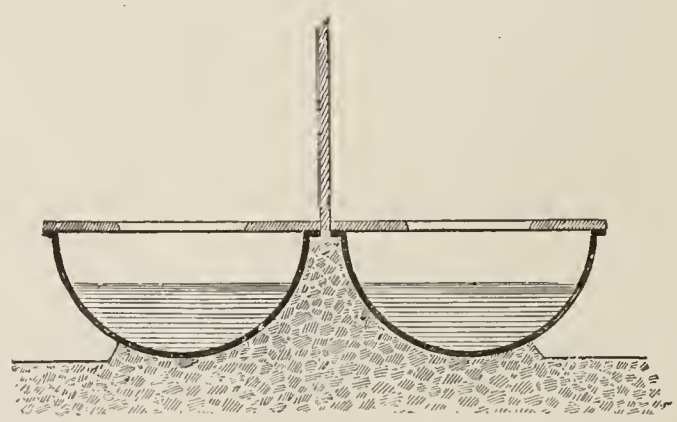
It has always been a difficult matter to provide privies, or water-closets, for school-houses that should be free from offense. Grown people are careless enough in their use of these auxiliaries, but school-children have hardly any regard for their proper care. The recently-built school-houses in Chicago have received attention in this matter which is commendable; still, there is opportunity for criticism. Without detail, it may be stated that the principal reason for improper construction may be found in the fact that the architect who "plans," does not understand what is wanted.

The Sanitary News has made an inspection of the outdoor closets connected with the Oakland school, in Hyde Park, just south of the city



Oakland School Water-Closets—Boys' Section.

limits, and has found a model arrangement. The building itself, which is entirely disconnected from the school building, but not far from it, is an architectural ornament to the lot. It was designed exteriorly by Architect G. H. Edbrooke, while the interior arrangements were given entirely into the hands of Mr. T. C. Boyd, of the firm of Bufton & Boyd, plumbers. The building is constructed of pressed brick with stone trimmings, and cost entire about $2,000. The seats are arranged in the middle of one wing, for the girls, in a double row, and along one side of the other wing for the boys, the urinal trough for the latter being placed on the opposite side. The accompanying cuts represent a vertical section of that portion to which it is desired to call special attention. The curved trough shown is of iron, and extends from each end, in two sections, to the middle of each wing, at a slight incline, where a large outlet is provided, connecting with the underground drain leading to the sewer. The trough is filled with water, about to the height indicated, through a ball cock at the opposite end. These troughs are emptied by the janitor of the building, at least once a day—oftener if found neces-



Oakland School Water-Closets—Girls' Section.

sary—simply by lifting a plug at the outlet. The water is drawn off with such rapidity as to scour the receptacle clean.

The noteworthy feature of the construction is that the trough is placed on the cemented floor, entirely above it, and not resting in a pocket, as is often the case, affording opportunity for the collection of refuse. The floor is entirely of cement, and is rounded up in front of the trough, thus preventing the soaking of water or urine under it and into the ground. The seats are laid directly on the top of the trough, and supported by it; in fact, there is not a particle of wood touching the floor, to become offensive, and decay, by absorption, except four or five small posts which support partitions

The teachers are provided with separate closets, and the whole are warmed by hot-water pipes, and are well ventilated by foul-air flues. The whole place is kept clean, and everything works so well that there is not an offensive odor to be detected at any time. Mr. Boyd's plans were original, and certainly very successful.

PLUMBING OF TO-DAY AS COMPARED WITH THAT OF THE PAST.*—I.

BY DAVID WHITEFORD.

This is a subject which is interesting and important, particularly to us as working plumbers and masters of the art, but not less so to mankind in general. Plumbing is and has been one of the great sources of health, comfort and enjoyment in the happy home, and yet connected with it are some of the most perplexing and unsettled questions that have agitated the public mind — questions which have set sanitarians, boards of health, and scientific and practical men to work with the view of perfecting the system and giving to the world the best measures that the combined genius of man in that line is capable of inventing. I do not know that I can say anything new to you on the subject; my hope will be simply to recall to your minds some of the things of the past which you already know; to compare these with things of the present, and thus to see what progress, if any, has been made.

Our history goes back to the days of old; its record runs along with the records of time. We read of the existence, from the very earliest ages, of tin, lead and brass. In the sacred scriptures, Job speaks of the beaten lead; Zachariah of the golden, silver, copper, and lead pipes; and secular history tells us that the terraces of the hanging gardens of Babylon were lined with sheet lead, and soldered together after the manner of to-day. Probably, too, lead pipes were used to lift the water to the lead pans used for watering the gardens, though by what means the water was raised is uncertain. We may safely say, however, it was not by suction and force pumps, though no doubt the plumber of Babylon was equal to the task. So the record runs on down through the centuries. We read of the ancient cities of Asia and Egypt, of Greece and Assyria, being supplied with water through lead pipes; and we know from excavations recently made in Pompeii that in the first century of the Christian era that city was supplied with water in the same way, as tons upon tons of lead pipe have been dug from the ruins. These pipes were made from cast sheet lead and formed into an egg or oval shape, and the seam soldered, as appears from specimens which may be seen in Edinburgh. The method of casting sheet lead and of making lead pipes from the sheet, continued, so far as we know, down through the middle ages into the sixteenth century. In the year 1539, the method of making lead pipes by casting it in short lengths in a perpendicular position was started; and in 1670 the process of making sheet lead by rolling or milling was introduced. At first, the article manufactured by the new method was not much used, because of the opposition of the plumbers and shipwrights, who thought it would destroy their business; but the opposition did not last long, and the improved method was soon adopted. It was in 1790, however, that the first lead pipe in coils was made by the process now in use,—that is, by the lead drawn or forced through dies.

Water-closets have been in use from a very early period. In the remains of Cæsar's palace at Rome there is still to be found the cistern with its pipes and cocks leading to what were evidently the different seats; and among the discoveries made in Pompeii, the pipes and closet bowl with spring cock still remain. Beyond the few hints which are thus obtained, we can say very little about the water-closet of early times, until it was introduced into England in Queen Elizabeth's time.

Bath-tubs, basins and fountains have been long in use, dating back at least to the days of Solomon's temple; for in those days, it is said, the priests bathed themselves in the molten sea, and washed in the golden bowl, and drank from the ever-flowing fountain. The Jews had private baths in their houses, and ponds in their gardens. Homer, also, alludes to the baths among the Greeks; and Pliny, the younger, to its existence among the Romans; and, it is said, Mexico. Chili and Peru have probably never been surpassed in their water supplies, including even gold and silver baths, and superior workmanship.

To Great Britain, more than to any other nation, we are indebted for our theory and practice in the plumbing art. From her we get our method of making sheet lead and lead pipe; also, the principle of our water-closets; the style and material of our baths and basins, and the heating and general arrangement of water pipes, as well as much of our ventilating system. Of course, in plumbing, every country, and even city, and town, has its own special requirements and adaptations. In this country, our summers are much hotter, and our winters much colder, than they are in Great Britain, and on this account many forms and details of the work in England, Ireland and Scotland differ from the forms and details of the work here. In the old country, as many of you know, the roofs of the houses are lined with sheet lead and zinc; all the gutters, too, with flanks, ridges, hips, valleys, chimneys and windows, are lined with sheet lead, while in this country all this work is done with galvanized iron, tin and zinc, and by tinners. These materials are not only much cheaper than lead, but, with us, I think, they serve the purpose much better, as in our climate lead would expand and contract too much to last any length of time; while, on the other hand, if in the old country tin and galvanized iron were used for the purposes named, they would rust out in a single year.

The system of heating water with us is much the same as it is in Great Britain. There, the arrangements usually consist of two tanks placed in the attic part of the house,—one for cold and the other for hot water. The cold-water tanks supply the closets, baths, basins, etc., and, also, the tank for hot water, the connection between the two tanks being made with a trapped pipe, with valve or gate on the hot water end, to prevent the hot water getting back into the cold-water cistern From the hot-water tank a pipe is carried to the kitchen fire and connected with a wrought-iron boiler, which constitutes the water-back and holds about forty gallons. The hot water is then carried back to the tank by a pipe, and continued through the roof for the escape of steam. The bath-tub, sinks and basins are supplied with hot water by this up-going pipe. Very often an intermediate tank is put in for storing up a greater quantity of hot water. By this method of water-heating a constant circulation is kept up, and you can get hot water the moment you draw from a faucet.

The ancient Romans had a system including three tanks, one above another,— the top for cold, the middle for tepid, and the bottom for hot, water; and from these tanks their various fixtures were supplied; but in what way the pipes were connected with the tank we are not told. The water was heated by a copper coil, very much like our pipe water-back. Sometimes the grate in their fire-places was hollow, and the water, by passing through this, was heated.

The bath-room of the Romans was constructed with hollow walls, and, underneath, in the cellar, was a stove or furnace, so that the heat passed up and around into the room by means of pipes. You can see how much more comfortable a bath-room can be made by some such means. In our day, we have the hot-air furnace, and steam pipes, which are much better adapted to such heating purpose than the device of the Romans; and yet, you very seldom find a bath-room well warmed; very often, it is the coldest room.

To conclude these remarks on the subject in general, it may be said that the system of plumbing which is followed in this country is superior in a great many respects to any other with which the writer is acquainted, and brings the cost of fitting up a house with hot and cold water, bath, basin, and the various other fixtures usual in good houses, within the reach of every man of ordinary means, so that no person of this class among us, to say nothing of the rich, need be deprived of the comfort and luxury which these conveniences afford in the house. Of course, there are hundreds and thousands of poorer people who cannot afford to put these accommodations into their little houses, or to pay the rent necessary to secure them. For this reason there ought to be maintained, in every large city at least, a system of public baths, to which this class of people might have constant access, either without charge, or at a small expense. Along this line there is great room for improvement, certainly in this country, and it is to be hoped that the day will soon come when the improvement will be made.

It may now be interesting for us for a little while to confine our vision to our own city, Chicago. Plumbing and the plumbing business, in Chicago have, within the past twenty-one years, to my own knowledge, made considerable advance in every direction. The first thought that impresses us is that the number of those engaged in it has increased—increased from tens to hundreds. This is true of masters and journeymen. Many of the young men who were then journeymen, or even learning the trade, have long since been occupying prominent positions as masters, and new men have come in among us, greatly swelling the number. Some, too, of our young men of those days are masters in the further west, and an honor to the trade. The older men of those days—where are they? Some of them, alas, are at rest. Among them, Raffen, Hughes, Beaton, Irons, and Campbell. Some of them are still

* Paper read before the Chicago master plumbers' association, Nov. 21, 1883.

among us, as Barnett and Murray, although not in business. Yet, there are Mills, Bassett, Livingston, Baggot, Hamblin, Hogan and Verity. Some of the old veteran journeymen are in this association, and for a great many years, some of you, nearly a score, have had shops of your own. Among these we may mention Rock, Boyd, Young, Bowden, Oliphant, Wade, Sanders and Murray, Jr. At the head of the water-department is still to be found Cregier, then chief engineer, but at the present time commissioner of public works, who is now probably the oldest in connection with the department. Then there is the venerable O. W. Woodford, the assessor, who, for some years, acted as permit clerk; Mr. Henry Napier, who was then but a boy, has filled the position for nineteen years. David Rowland, the old tapper, has been twenty-nine years in the department. The only regular plumbing supply-house in the city twenty-one years ago was that of McFarlands, and about one year later, Peterson & Patersons. Wolff and McGuire and E. Smeeth supplied us with our copper boilers, and T. C. Smith & Co., Small & Darley with our brass work. The first establishment for making gas-pipe in Chicago was started by Crane Bros. about twenty years ago, with Joseph Fieldhouse as superintendent. At that time, the water-works were situated where they are at present. But we were supplied by water pumped from the lake only a few hundred feet from the shore. Many of you remember how bad the water was at times. The manufacture of filters was carried on by Thomas George, who also did plumbing. The fish were the source of great trouble, stopping up the supply-pipes. That was the time when the plumber had to make good use of his force-pump to drive back the fish into the main pipe, or to break them up, and oftentimes we had to dig to the main-pipe, and take them out at the tap. But times have changed since then; now, we have the tunnel, which was a great undertaking, successfully accomplished, and which brought with it to the city an abundant supply of pure and healthy water, as well as relief to the plumbers. It is now twenty years since the writer commenced business in the city, in partnership with William A. Verity. Then there was no practical plumber west of Halsted street except myself; though I learn that Friend Hamblin had been located on Madison street just west of Halsted street previous to the war. At that time, the main water pipes were not laid further west than Centre avenue, except in some of the leading streets—Madison, Washington, Lake and a few other streets. It will be remembered that George Ellicott furnished the people with water from house to house, his rig was a single horse and wagon and big round barrel that held a hogshead, for which, full, he paid five cents; he hauled it two miles and more and sold it for fifty cents, even to our present mayor, Carter Harrison, who lived on, or near, Harrison street and Ashland avenue. In a few years the main-pipes were laid and George lost his business while the advantage went to the side of the plumbers.

In those days there was plenty of work to do with comparatively little contract work, and generally the people were satisfied with the charges made and paid their bills without grumbling. Nevertheless, since then we have advanced, not financially, by any means, but first in the quality and quantity of the material we use on a job and in getting less for it, and then instead of having four shops on the West Side, we have increased them to more than forty; still we have plenty of work to do and there is plenty of room for us all. Very few of us, however, can boast that we have made ourselves rich in the business. I presume I should be safe in saying that only a very few of those who are here to-night, who were in business in the city twenty years ago, can say that they are at present worth $30,000, as the result of these long years of hard and faithful service—no greater a proportion, perhaps, than one in a score. The truth is, ours has never been the money-making business that the people and the press have made it appear to be. Often we hear the complaint from persons that the plumber has cheated them—that his bills are unreasonable; and often, especially when you are doing repair work, you are met with the remark: "The man broke this;" or, "The pipe leaks at the same place it was fixed before;" and so on. In ninety cases out of a hundred it is a mistake, or an untruth. It would seem that by some means, the people have been educated to look upon plumbers as a class to beware of. As an illustration: Not long ago a well-dressed lady called in at my store and said she wanted some work done. In the course of conversation she asked how much I would charge to furnish and put in a new faucet. I told her $2.50. She said: "I have always heard it said it costs a fortune to speak to a plumber." It is a little curious where people get their information; but, they "have always heard it said." Self-praise is no honor, but I believe that as a class of tradesmen, in the opinion of unprejudiced judges, we stand as high and are considered as righteous as any of our accusers.

CINCINNATI'S CURSE, AND ITS LESSON.

To the Editor of the Sanitary News:—In viewing, or rather reviewing, buildings from a sanitary stand-point, it is a somewhat difficult matter to determine where insanity ceases, and philosophy begins, and to the student desirous of exploring this region of sanitary science, Cincinnati offers a field of large dimensions. It may astonish some of the house-building philosophers to tell them that there are at least ten thousand dwellings in this city unfit for human habitation, by reason of their unhealthy surroundings. The insanity of neglecting, or altogether ignoring, the proper sanitary construction of buildings has, I believe, reached the climax, and, in the near future, through an enlightened public sentiment, it will be neither safe nor profitable for such philosophers to prolong their insanity. Progress seems to be the watchword with sanitary legislation and the demands of an enlightened public will soon relegate to oblivion the philosopher, and the philosophy, that ignorantly or penuriously ignores the proper sanitary construction of buildings.

I may state, right here, that our "common council" has recently made itself more than famous (which is infamous), by appointing five saloon-keepers and one doctor as our board of health. Great heads! Has not the bottom fallen out of its judgment basket? Yet in one (and only one) aspect of the case, it appears to be right, because the gutters of the city receive the personal supervision of the five saloon-keepers, and the result is, they are made as clean and comfortable for their patrons to enjoy a snooze in, as other circumstances will permit. But some citizens never are satisfied, and loud complaints are very common about the composition of the board of health, and some have the audacity to say that other places besides the gutters should receive some attention from this more than noble (which is ignoble) board, and the declaration is vigorously made that the gutters of the city, before their official interference, were clean enough, and suitable enough, for the board's patrons to embrace Morpheus, or perform their ablutions in. Shame, eternal shame, should mantle the cheek of every member of the council, which contributed to such an outrage on this community.

The great desideratum of our times is competent official supervision of the sanitary construction of buildings, and until this is an accomplished fact we may expect that the average city dwelling will continue to be constructed as at present, which is, not only with an eye, but with the whole head single to the profit of the house-building philosopher; hence, the outside is made to appear beautiful and inviting, while inside it is a very lazar house, continuously giving a hearty welcome, and presenting a standing invitation, to every pestilence that stalks abroad. As the plumbers are the men who are publicly held responsible for this unsanitary condition of affairs, and upon whose unfortunate heads are heaped the ignominy and derision of an outraged public, they will be false to themselves and traitors to the profession they pretend to adorn, if they do not as a body demand the legislation that will compel all owners so to construct their buildings that the health of the tenant or that of the general public, shall not be endangered thereby. And when this is accomplished, then shall the lions of the tribe of architects lie down with the lambs of plumberdom, and they shall be in their right minds, and they shall reason together as becometh men of a high order of intelligence; and the lion's wisdom shall plan, and the lamb's genius shall intelligently execute, the beautiful designs and exquisite private conveniences in such a manner as will command the respect of the community in which they reside; be a credit to themselves, and an honor to their professions at large.

"Junius."

SANITARY CONDITIONS OF GUAYAQUIL, ECUADOR.

To the Editor of the Sanitary News:—Your request that I describe the sanitary condition of Guayaquil—its sewerage, the plumbing of the houses, the care of the streets, death-rate, etc.—has been received and duly considered. You probably did not appreciate the fact that you were asking me to picture the ways and practices of the ancients, a description of which may possess some value as a contrast with modern methods in countries and communities where sanitary progress is accepted and adopted. It may truthfully be said of Guayaquil that it has no sanitary arrangements, unless a law drawing a line between

classes of filth that may be thrown into the streets, has a slight bearing upon the question of public health.

Guayaquil has a population of 30,000, composed of Indian, Spanish and Negro people; pure bloods, cross-breeds, and a few hundred whites —the latter chiefly Europeans. The people average shorter in stature and smaller in size than those of the United States and Europe. Though smaller, they are fairly developed, physically, and appear to be fairly hardy. Their habits of life, as related to health, are no worse than those abounding in many other parts of the world. Cleanliness is not a conspicuous virtue of Guayaquil more than of some of the Italian towns, notably Naples. It has nothing that properly can be styled public sewers, no house plumbing, and no water-closets. The more solid parts of the filth are received in half-barrels and dumped in the river, while the liquid parts are thrown into the streets to be absorbed by the atmosphere. It will be rightly inferred that this conditions of things is not conducive to good health, and yet it is a great injustice to charge any class of diseases upon the climate, as is frequently done. I have resided for about three months here, but was in Venezuela for nearly a year, in about the same latitude, and have been at the principal places up and down the Pacific coast, between the gulf of Guayaquil and the gulf of Lower California, and it is my judgment that the "climate" is outrageously maligned by being charged with the sins of the people. Could Chicago stand what I have portrayed? In my opinion, the climate, of all Ecuador is excellent. The temperature at all seasons of the year is very uniform, the mercury, in the summer ranging from 66° to 80°, Fahrenheit, and in the winter from 70° to 84°, being slightly warmer in the winter than in the summer. There is seldom a change of more than eight degrees in one day, and never more than ten. There are no fogs, no gales, no Illinois "cyclones," seldom thunder and lightning, and the only notable occurrences are occasional earthquake shocks and governmental revolutions. The temperature is rarely excessively hot, and is usually tempered by breezes to the geniality of June and September in your city.

Guayaquil is built upon a loamy, river-formed plain, the natural soil possessing the appearance and leading characteristics of the prairie soil of Illinois, and having the other peculiarity of making very muddy mud while wet. The surface of this plain is about four feet above high water. A river, a mile in width, flows past the city front, and a mile and a half in the rear of the city is a large, salt water estuary that has no connection with the river. These bodies of water have a tidal rise and fall of twelve feet, affording the amplest and most economic means of sewer flooding, if the sewers existed. Of course, if there were sewers all the other usual accessories conducive of health, convenience and happiness could easily be provided, and with them, I have no doubt, Guayaquil would be one of the most healthy cities in the world. The sanitary condition of the city is being improved by the construction of stone pavements that assist in getting rid of the foul waters that are thrown into the streets, and there is hope for the future in the circumstance that a system of sewerage is talked of, showing that progressive ideas are being developed.

The principal diseases are fevers and dysentery, traceable to the cause stated. The daily death rate averages ten, being at the annual death-rate of almost 122 to each 1,000 of the population. A very large share of the deaths is of infants. Those living dirtily in dirty places come next. Those practicing cleanliness, and living temperately in clean localities, usually have good health. HORATIO N. BEACH.

U. S. Consulate, Guayaquil, Nov. 10, 1883.

OLD-TIME PLUMBING.

TO THE EDITOR OF THE SANITARY NEWS: — I was much amused and surprised in reading a historical sketch, prepared by Mr. Andrew Young, the worthy president of the Chicago master plumbers' association, and read before that body at their meeting November 7. Mr. Young, in speaking of the early plumbing of Chicago, says: "The sewerage system of that time consisted in extending a wooden box sewer to the street, to terminate in a hogshead under ground;" "the closet of that period was the pan closet." Yet, Mr. Young tells us seriously that under those happy conditions "sewer-gas was unknown," and the sanitary engineer had not yet made his appearance. Well, Mr. Editor, it would seem ridiculous to argue that point. I will only say that, if there was no sewer-gas, nor sickness, the closets and wooden sewers were not used for the same purpose such things are now-a-days in Chicago. Perhaps the mechanical skill exercised in connection with old-time plumbing was for ornament, and is the reason why our worthy predecessors escaped what we, with all our improvements and all our sanitary engineering, have not yet entirely succeeded in getting rid of—sewer-gas. We are also informed that, notwithstanding the primitive state of plumbing at that time, the plumbers at their gatherings indulged in much sanitary discussion—"in fact, more sanitary science was explained and argued, than has been written upon from that day to this." In my opinion, very little sanitary science went a long way in those days; very little the early settlers of Chicago cared, or knew, of sanitary science thirty years ago, when, with wooden sewers and filthy pan-closets (which are not fit to have in a barn twenty feet from the house), they were not sensible of the presence of sewer-gas in their houses. As regards the claim to good, honest work in those days and good mechanics, I agree; the latter executing, in good workmanlike manner, the very little they knew about good sanitary plumbing. I am sure that the necessity of very much engineering skill in laying a wooden sewer, running up a stack of soil-pipe, putting in a pan-closet, or, in other words, doing such plumbing as is required in Bridgeport, or any such place to-day, cannot be claimed. If I were to draw a comparison between the plumber of thirty years ago and the present time, I would say that, the average old time plumber was a better workman. He served an apprenticeship; he learned to do what was then required of him pretty well; but, I do say, without fear of contradiction, that the well-educated plumber of to-day, the man who keeps abreast of the times, is an artist compared with the mechanic of a generation ago; consequently, we have better, safer and more reliable plumbing now-a-days than was ever dreamed of thirty years ago. I will ask Mr. Young, or any other admirer of old-time plumbing, has he not learned more about how plumbing ought to be done in the past five years than he ever acquired in his whole time at the business previous? I think, on serious consideration, I hear him say: "Well, yes." A MODERN PLUMBER.

Chicago, Nov. 22, 1883.

CURRENT PUBLICATIONS.

POPULAR SCIENCE MONTHLY.

In the unusually interesting number for December, the articles on female education from a medical point of view, malaria and the progress of medicine, are very inviting.

NORTH AMERICAN REVIEW.

Under the head of causes of felicity, the issue for December publishes a portion of Dr. B. W Richardson's interesting lecture at the recent congress of the sanitary institute of Great Britain. Railroad and public time is the subject of an interesting paper from the pen of Prof. Leonard Waldo.

THE CENTURY.

A memoir and portrait of Peter Cooper form a deserved feature of the December number. The fairest county in England is illustrated in a manner becoming so lovely a piece of nature.

CHRISTMAS NUMBER OF THE PUBLISHER'S WEEKLY.

This number is fully as successful, as an art production, as it is as an indicator of what books our publishers are putting on the market, and how they are being put on. The illustrations, as taken from the several holiday gift-books and Christmas books for children, prove to be very interesting exhibits of fine design and engraving.

PUBLICATIONS RECEIVED.

"The Geology and Topography of Iowa in a Sanitary Point of View." Prepared by P. J. Farnsworth, M. D. for the Iowa State Board of Health.

"Ventilation." By Justin M. Hull, M. D.

"Health Laws of the State of Iowa." Compiled by the State Board of Health, 1883.

"Building Superintendence: A Manual for Young Architects, Students, and Others Interested in Building Operations as Carried on at the Present Day." By T. M. Clark, Fellow of the American Institute of Architects. Boston: J. R. Osgood & Company, 1883.

"Sanitary Work in the Smaller Towns and Villages." By Charles Slagg, Assoc. M. Inst. C E. Second edition, revised and enlarged. London: Crosby, Lockwood & Co., 7 Stationers' Hall Court, Ludgate Hill, 1884.

"Tobacco and Its Effects." By G. F. Witter, M. D., of Grand Rapids, Wisconsin. Pam. pp. 32.

"The Typhoid Fever of America, Its Nature, Causes, and Prevention." By R J. Farquharson, A. M., M D., Secretary of Iowa State Board of Health. Pam. pp. 12.

NOTES AND NEWS.

ANNOUNCEMENTS.

Dec. 19, At Chicago. Lecture by Oscar C. DeWolf, M. D., before the Master Plumbers' Association.

Dec. 19, At Chicago. Regular meeting of local Master Plumbers' Association.

Jan. 1. 1884 At Nashville, Tenn. Regular meeting of the State Board of Health.

Jan. 1. At Concord, N. H. Meeting of the State Board of Health.

Jan. 8. Lansing, Mich. Regular meeting of the State Board of Health.

PERSONAL.

Dr. Albert Merrill has been appointed a member of the Missouri state board of health.

Andrew Rinker, city engineer of Minneapolis, recommends the construction of a tunnel to be used to discharge the sewage of North Minneapolis.

Sir Charles William Siemens, the well known electrician, died Nov. 20 in London.

The salary of Chief Engineer Col. Wm. Ludlow, of the Philadelphia water department, is $8,000 for the present year.

The new commissioner of health of St. Louis, Mr. Stevenson, has organized his department with Dr. G. W. Carson as secretary.

BUILDING NOTES.

A building and improvement association in Toronto is to ask for a charter, its purpose being to clear out old rookeries, and replace them with decent habitations.

The bricklayers of San Francisco have asked the architects to segregate all brick-work exceeding $300 from the general contract, and that it be awarded as a separate contract.

Six architects have submitted plans for a new court-house at Adrian, Mich., to cost $50,000. The successful architect must give bonds that the expense will not exceed the appropriation.

The Presbyterians of Chicago will erect a hospital to cost $150,000.

The Indiana insane hospital commission has adopted the conjoined-radiate plan for the asylum at Evansville, and the detached pavilion plan for that of Logansport.

Bricks impregnated while at a high temperature with asphalt are successfully used for street pavement in Berlin,

Peabody & Stearns, architects, of Boston, represented in this city by Ion Lewis, are building a handsome residence for Judge Lambert Tree, at the corner of Cass and Ontario streets. The structure is of brown stone and will cost $100,000.

LIGHTING.

The city of Dayton, O., has renewed its contract with the electric light company.

A chandelier having 820 jets is to be placed in the Alhambra theatre, London.

The Levytype Photo Engraving Company, of Chicago, have just placed in position an electric light having 6,000 actual candle power.

An Electric Light and Power Co. has been organized in Lansing, Mich.

The Societe Internationale des Electriciens of Paris, has 830 members.

The best display of electric lighting yet had in England was at the fisheries exhibition.

VENTILATION.

The famous black hole of Calcutta, so often referred to by writers on ventilation, has just been excavated and identified by Mr. Bayne, of the East India Railway Company.

At a recent meeting of the New York medico-legal society the statement was made that, in two years, 3,000 school children in New York had lost their lives because of the foul air they had been compelled to breathe.

The board of health of Pittsburgh are considering the heating and ventilation of street cars in winter.

CONTAGIOUS DISEASES.

The yellow fever epidemic at Pensacola is believed to have been caused by germs from last year's cases.

Small-pox is present at Gadsden, Tenn.

San Francisco has had good reason for maintaining a strict quarantine the present season. The Newbern, the Granada, and lastly the San Blas have brought yellow fever into the harbor, but it has not appeared in the city.

CONTRACTS, BIDS, ETC.

The Kingsbury Run bridge at Cleveland will cost $235,000.

The contract for the new high-service reservoir in Cleveland was awarded to Freeman and Hall, at $120,651.

WATER-SUPPLY.

One mile more of piping to be laid in Adrian, Mich., will complete fourteen miles of water-mains for the new system, which will be finished Dec. 1.

In Kalamazoo, Mich., during the past season, 10,350 feet of water-mains have been laid, being nearly equally divided between four-inch and six-inch pipe. Eighteen fire hydrants and twenty-four water gates have been placed.

A water-main four inches in diameter, weighing with packing and anchorage three hundred and fifty tons, was laid across East river, New York last month.

New Britain, Conn., will bring an additional water-supply from a lake one mile from the city, by means of a canal.

The artesian wells at Cheyenne Wells, Colo., are progressing finely. In one well a large flow of petroleum gas was struck.

A vote is to be taken on the contract of the water company with Georgetown, Texas.

Water works will soon be opened at Columbus, Texas.

A water famine in Waterbury, Conn., has brought on an epidemic of typhoid fever.

The new pump of ten million gallons capacity daily has been started in Minneapolis.

Sidney Smith, C. E., formerly of the Boston water-works, is engineer in charge of projected water works at Tampico, Mexico.

DRAINAGE AND SEWERAGE.

The town council of Cape Town invites plans and specifications for a system of drainage.

H. Percy Boulnois, author of the new hand-book for municipal and sanitary engineers, has patented a new form of sewer pipe.

Thirty flushing tanks at Bournemouth keep the sewers clean and sweet.

It is claimed by the Massachusetts state board of health that the sewerage of Nahant, Mass., is the only thorough system of separate sewers in this country.

Col. D. P. Haddin states that not only are the citizens of Memphis entirely pleased with their sewers, but he has trouble to extend the system fast enough to suit the people.

The city council of Dayton have stopped the removal of garbage.

MISCELLANEOUS.

From one hundred and seventy-three inmates in the House of Bethlehem, a home for illegitimate children in Ottawa, Ont., one hundred and seventy-one died during the past year. This death-rate is practically annihilation.

The most instructive exhibits of the Berlin hygienic exhibition will be retained by the committee as the nucleus of a permanent museum of hygiene.

A society for instruction in first aid to the injured has been organized in New York city.

In his annual address as president of the health section of the British social science congress, T. Pridgin Teale read an address on the effect of modern systems of education on health, in which he denounced as excessive the nervous wear and tear caused by examinations.

The president of the national wholesale druggists' association in his late report said: "The commercial honesty which instinctively recoils from all profit made by selling adulterated goods in place of pure is equaled by the life and health of the community which it seeks to guard."

William F. Allen, C. E., of Bordentown, N. J., is the originator of the new standard time.

The queen of England has permitted the meteorological society to use the prefix "Royal."

CURRENT TOPICS.

THE public water supply system of a city is frequently and justly charged with supplying water of an impure character. But there are cases where the water may be pure when introduced into the main, but may be seriously contaminated from the imperfect receptacles, storage-cisterns, etc., belonging to the consumer. Especially is this so in systems, as in London, where the supply is intermittent.

GLANDERS, a disease fatal to man and beast, has again appeared in Illinois, this time near Champaign.

THE hygiene of high buildings recently received consideration from Dr. S. Oakley Vander Poel, formerly health officer of the port of New York. He condemned high houses as dwellings, believing that in case of epidemics it would be impossible to isolate the sick. To this objection, it may be answered that cases of contagious diseases located in houses unfavorable for safe and complete isolation, should be removed to the hospital at the discovery of the nature of the disease. He also argues that the families in the first three stories are largely deprived of sunshine. This is true, and would be true nearly to the same extent if all the houses were three stories high, while, if some of them in favorable locations, such as corner lots, run up to six and seven stories, the surrounding buildings, and the lower stories of the high buildings are not seriously robbed of their sunlight, while the higher stories receive unstinted light, and purer air.

THE government has purchased fifty acres of land at Garfield, N. J., which will be used as a quarantine-detention ground for all cattle arriving at the port of New York. Cattle known to be suffering with contagious diseases will not be quarantined there, and the greatest care will be taken that unrecognized diseases will not be spread.

THE question of responsibility in cases of lead-poisoning contracted by drinking water from the public supply was recently tried in Huddersfield, England. A man sued the mayor of the city for damages because of lead-poisoning, so contracted. The evidence showed, although the water company had entire control of the lead service-pipes in the man's house, that he could have had iron pipes if he had chosen to pay for them, and that the water was pure when it left the company's mains. The court would not allow damages.

THE resolutions introduced by Prof. H. B. Pierce into the deliberations of the New Jersey sanitary association indicate a bold step forward in the direction of practical hygiene in the schools already built and maintained without proper sanitary conditions. He would first have the school authorities and the school children educated as to what are contagious diseases, and that in case a contagious disease appears, the teachers have power to suspend all scholars connected with the family; that public funerals in contagious diseases be forbidden by law; that primary classes have shorter sessions; that individual recesses supplant general intermissions; that calisthenics be required twice in the morning and once in the afternoon; and, finally, and most important of all, that the state board of education require of all teachers some knowledge of the elementary principles of hygiene.

AT a recent meeting of the New Orleans auxiliary sanitary association, Dr. Stanford Chaillé, asked the very pertinent question: Why do the statements of the board of health concerning small-pox in New Orleans, differ from those of the sanitary director of the association? For November the board of health reported the disease exterminated, while Dr. Watkins reported thirty-eight cases. Will Dr. Herrick answer this question?

AT Norwalk, Ohio, there professes to be a great excitement, says a Chicago daily paper, because a plumber had failed, as if it were impossible for a plumber to accomplish such a brilliant move in the financial world. It is time such inane jokes should give way to scintillations of wit which shall please others than the hysterical "funny men" of the daily press. THE SANITARY NEWS will kindly give them the foundation for an excellent joke. The board of control of the San Francisco house of correction have appropriated $100 with which to purchase plumber's tools for use by the prisoners in executing repairs. A newspaper man, who thoroughly understands how to construct jokes at the expense of the plumbing fraternity, may skilfully show how this $100, if used to hire a master plumber to superintend the repairs, might possibly cover the cost of putting in a new faucet; also, how the wise and far-sighted government, instead of using this $100 in one poor little job, have invested it in plumber's tools with which the prisoners themselves shall correct the evils of the house drainage system of the prison. He could also show (as there are no plumbers among the prisoners, plumbers, of all classes, having the least provocation to steal), how the work would be performed by the ignorant prisoners under the direction of the warden, in such a manner as would permit sewer-gas to invade the prison and kill off a large proportion of the prisoners, thus lessening the expense of maintaining the prison and permanently removing a large number of the most dangerous elements of our social structure. What enterprising newspaper will be the first to make use of the material so kindly offered?

THE Wisconsin state board of health have issued a circular calling attention to the fact that the season is now approaching when small-pox is usually most prevalent, and urging the owners of lumber camps, paper-mills, etc., to have their men vaccinated. At the time the circular was issued, there was not a known case of small-pox in the state.

IN Dundee, Scotland, a dairyman used a portion of his unventilated, undrained house as a dairy, and, while a boy in his employment was sick with scarlet fever, he allowed his wife and servant who had care of the boy, to milk cows, handle milk vessels, and dispose of milk to customers. During four days seventeen persons in families supplied by milk from this dairy were attacked with the disease, four of whom died. The dairyman was arrested and fined five pounds.

AN eastern trade journal which claims to be a sanitary instructor for plumbers, has renewed its bitter antagonism to the national board of health, and even goes to the length of printing the foolish and ill-tempered speech made by Mr. Ellis in the house of representatives during the last session of congress. Not long ago, THE SANITARY NEWS took physicians to task for thinking that all there was to sanitary science was the regulation of the practice of medicine and

the prevention of contagious diseases. Now the plumbers' self-appointed champion begins to attack without motive and with an old, over-drawn tirade, the only national health authority this country has ever had, and one which certainly did a great deal to advance the knowledge of sanitation during its short career. To be sure, all its labor was not in the direction of establishing the true principles of house-drainage, although there is not a reading plumber in the country who is not better informed on siphonage, because of the experiments of Waring, Philbrick and Bowditch; and yet these experiments were performed at the expense of the board who "frittered away the public moneys." This "most stupendous national humbug" frittered away its appropriations on such little side issues as contagious diseases of animals, diphtheria, drug and food adulterations, pollution of the soil, pollution of the water-supply, and on the unsanitary condition of the plumbing in summer resorts! If the paper referred to desires to represent the sanitary side of the plumbing fraternity, it will do well to cease its unwarranted attacks on boards of health, because the most enlightened plumbers of to day are thoroughly in sympathy with such movements.

During an interesting discussion on ventilation at a recent sanitary convention, a physician of long practice threw a bomb into the camp by stating his non-belief in the poisonous offects of carbonic acid gas, saying he believed death to have been caused by asphyxiation in a case mentioned, where two men died in a well in which there was a deposit of carbonic acid gas, because of the exclusion of atmospheric air, rather than from any poisonous action of the gas. All authorities speak of the "poisonous" action of this gas, and seem to be agreed upon its character. All experiments seem to point to a deleterious effect which its presence, above six or seven parts in ten thousand of air, has upon the human system; whether this effect is caused by a dearth of oxygen, or by the occult action of the gas, seems to be a hard point to decide. The particular injurious effect which results from the inhalation of carbonic acid seems to be evident in the lessening of the free exchange in the red blood corpuscles of carbonic acid for oxygen. Regnault's experiments, as well as those of Reiset, showed that carbonic acid, even when occupying 17.23 per cent. of the air, had no harmful effect on animals when confined in it twenty-six hours, providing there was twice the usual proportion of oxygen.

The supreme court of Minnesota, through Judge Mitchell, has delivered an opinion holding that if a servant having knowledge of defects in the instruments furnished him with which to labor, gives notice of the defects to his employer who promises they shall be repaired, the master is responsible for injuries caused thereby, if the master requested the servant to continue in service and the injury is received before the time expires within which it was promised the repairs should be made, and where the defect was not so serious as to cause a prudent man to cease using it at once. This opinion may be cited in action for injuries received in many accidents, such as boiler explosions, etc.

The board of health of Dayton, Ohio, recognizing the necessity for a pure and uncontaminated milk supply, have issued a series of regulations governing the dairy business of that city.

The minister of the empire of Brazil has authorized the central board of public health, of which Dr. Domingos Freire is the president, to begin, at the vaccine institute in Rio de Janeiro, vaccination with the attenuated cultures of the microbe discovered by Freire, and attributed by him to be a preventive of susceptibility to yellow fever. Up to the end of October, forty-eight persons, mostly foreigners, had presented themselves for vaccination. A public invitation was made November 10, in which Dr. Freire asks "newcomers to the city and any others who desire to submit themselves to the inoculation, to come to the instituto vaccinico on Wednesdays and Saturdays, between 10 A. M. and noon, to undergo inoculation therewith;" and announces that from the date of the circular to the end of January is the most appropriate time for inoculation.

That something is to be done to better the condition of the schools of New York city is evident from the statement of the president of the department of education when he says: "The public may depend upon it that we shall spend all the money we can in making the schools healthy." If there is no demogogism about the president, the public may be assured that there will be a vast amount of money spent, because the schools are in a horrible sanitary condition. Whether this is true of the schools of New York alone is not a matter of doubt. There are many schools in Chicago whose sanitary condition, as regards purity of air, is not much better than was that of the Cook County jail a year ago. These schools should be inspected, and probably will be.

The steamship Scythia for the second or third time within the past few months has conveyed small-pox to this country. In the last instance, one of the stewards was admitted to the Riverside hospital from the ship. There is no evidence given that the ship was detained at quarantine on account of it.

A year ago there was little prospect of unanimity of action between the health authorities of this city and the plumbing fraternity. In an earnest endeavor to enforce the provisions of the state law regulating plumbing, imperfect though it was, the health commissioner found it necessary to prosecute plumbers who persisted in doing bad work. With a feeling that the persistence of the officers of the health department in ferreting out "skin" plumbing had its origin in an inborn and universal desire to harass and degrade the plumber, the fraternity had any but kindly feelings toward their "persecutors." On the other hand, it cannot be denied that the health authorities were disposed to place all plumbers in the same category, and refuse to believe that there were honorable, intelligent and progressive men among them. This mutual hostility has gradually melted away, under some soothing influence, and hearty co-operation in sanitary matters from this time on seems assured. This is indicated by the proceedings of the last meeting of the association, at which Dr. Oscar C. De Wolf, the commissioner of health, delivered an address. The attendance at the meeting and the interest shown by those outside plumbers' ranks indicate that the sanitary work of this city will hereafter be encouraged and performed by allied forces, and on a scientific basis. The commissioner's suggestion that the plumbers' association be incorporated, and become an arbiter

in its trade, will probably be carried into effect at once. This is one step in the right direction; others are sure to follow.

As to Dr. DeWolf's suggestion that there be a return to the apprenticeship system, by which young men might be properly prepared for their occupation, passing through the stages of apprentice and journeyman to master, there is room for discussion. It is absurd, of course, to require an examination for a diploma, or license, for plumbing, unless means are somehow provided for acquiring the necessary education. If all master plumbers took a fatherly interest in their apprentices, young men might become "practical" plumbers. But the commissioner does not look upon the "practical" man, in any profession or trade, with much admiration. He would class plumbing with the industrial arts, and might have gone further. Correct plumbing is based on scientific principles, which can no where be taught so well as in a school. If other industrial arts can be successfully taught in trade schools, why not plumbing?

THE national board of health has issued its annual report for the fiscal year ending June 30, 1883. From it, it is learned that the total expenditures of the board during the year were $97,332.60, of which over one-half was for aid to state and local boards of health. The board, having been left without money to prosecute its labors, turned the material in its care over to the marine hospital service. The secretary has added a summary of the four years' work accomplished under the provisions of the act of 1879, which shows their total expenditures to have been $639,446.19 from April 1, 1879 to June 30, 1883. The record of how it was spent fails to show any injudiciousness on the part of the board.

THE contents of this issue of THE SANITARY NEWS are somewhat noticeable for the abundance of matter concerning house-drainage and sewerage. That these subjects are important no one will deny. The subject of sewerage is just now occupying the attention of the public in many cities where this paper is largely circulated, and it is partly in response to requests from these localities, that so much concerning sewerage and its adjunct house-drainage is given. The valuable article by Mr. Hering on the essentials of house drainage is concluded in this number. Such has been the demand for this article, that it will undoubtedly be published in a pamphlet form. The description of the sewerage of Nahant offers a solution to engineers for similar small cities, though, of course, the local circumstances may alter the details somewhat. The views taken by Doctor Oldright in his article on the overhead ventilation of sewers, are offered as an answer to the question of how to get rid of sewer-air in houses already connected with sewers by the old system. In entirely new construction, Doctor Oldright would undoubtedly favor an unimpeded circulation of air from the sewer direct through the soil-pipe of every house. The article on Chicago sewerage is a continuation of a series of articles on the actual methods of sewering a large city. In the article by Mr. David Whiteford on plumbing of to-day as compared with that of the past, plumbers will find many amusing and instructive suggestions. The lecture by Doctor DeWolf before the master plumbers' association of Chicago will prove of more than passing interest because of its offering a remedy for an evil which good plumbers and the people at large would like to see corrected, to wit, skin plumbing. As regards the disposal of sewage by other means than befouling streams, the position of THE SANITARY NEWS is warmly endorsed and strengthened by a communication from one of the most prominent and ablest sanitarians of Indiana, whose name, if it were permitted to be added, would only make his letter more forcible.

HOUSE drainage has been written up and written down so extensively, both in technical journals and in the daily papers, that everybody, it would seem, ought to know pretty much all about it. There has been, as yet, no indication of an end to the apparent defects which a system of house drainage can have, as possibilities are discussed with all the gravity that belongs to facts. If there ever has been discovered a proper method of construction of house drainage, no two persons, hardly, can be found to agree to this. When there is so much confusion among the minds of the people—and this includes professional and trades people—it is gratifying to have the subject discussed in so plain and practical a manner as has been by Mr. Rudolph Hering, in his paper on "The Essentials of House Drainage," which has been published in THE SANITARY NEWS. There is nothing mysterious about house drains and they need not be complicated. The average householder can understand enough about their proper construction to secure his family against danger from their use, as well as the plumber or sanitary engineer. But the simplest facts need to be reiterated until they are stale sometimes, before they become well known. The trouble generally arises in an anxious and inborn desire to have things different from other people, in house construction and furnishing, and the result is a series of complications which defy all known principles of hydrostatics, pneumatics, and—practical, successful house drainage. It would seem that, in all the discussions that are had on this subject, too much stress is laid on the supposed necessity of having apparatus that will be quite, if not entirely, automatic. Let the argument be, then, that there should be a return to the primitive methods of our ancestors, who used neither water-closets nor out-houses. The person who is too fastidious to give reasonable attention to the proper disposal of the waste of his body, or is too careless to do it, is not fit to live. As well talk about automatic means of eating as a system of drainage, which shall relieve one of any attention to it. It has become a matter-of-course to condemn, without reservation or qualification, the pan-closet. Not undertaking to defend it, the statement can be truthfully made that the pan-closet is capable of use without giving offense, and a "system" of house drainage may be constructed with neither soil-pipe nor traps ventilated, with lead-calked joints in an iron soil-pipe, and earthen drains, which shall neither offend the senses nor poison the blood by escaping sewer-gas. But there must be intelligent use of the drains and appliances, which a child can be taught. Without such intelligent use, one will not have to look far to find as filthy hopper, wash-out, valve and plunger closets as the "objectionable" pan-closet. There is danger that the discussion on the merits, and more particularly the demerits, of this and that water-closet and trap will add to the existing confusion among those who are trying to get at the facts. It is on this account, it may be repeated, that Mr. Hering's admirable and concise presentation of the subject is commended.

CHICAGO SEWERAGE — CATCH-BASINS. — XVII.

The catch-basins, as a part of the system of sewerage of Chicago, were originally placed at the corners of the streets, and this has continued to be their location until within the last two years. The early records and reports do not show why they should have been so placed; following the custom, it probably did not occur to the originators of the system that they could be put anywhere else. Their necessity was beyond a doubt, since neither ordinary flow in the level streets of this city, nor any flush which could be secured, would carry away the deposits of sand and refuse. It must be borne in mind that storm water and sewage both flow into the sewers of this city; if they were disposed of separately, catch-basins might, possibly, have been entirely dispensed with.

In the latter part of the year 1881, steps were taken to have all new street basins built at or near the middle of the block, the grade of the street being correspondingly changed, of course,—the summit at the middle of the block, and the lowest point at the corners. In November of that year an order was introduced into the city council to this effect. The advantages of the change, as urged, were: (1) It would allow the street crossings to be nearly or quite level with the sidewalk. (2) The drainage would be from, instead of toward, the street crossings, which tended greatly to accumulate mud at these points. (3) All the aprons, or gutter bridges, would be avoided. These were expensive to build and maintain, and considered dangerous to pedestrians, horses and vehicles, and too narrow for convenience of travel. Besides, they caused accumulations of filth, which, if not promptly removed, acted as a dam, and prevented the free flow of water to the catch-basins. (4) The intersections of streets would be relieved of the deep and dangerous depressions at the junction with the sidewalks, and thus allow more space and greater freedom in turning corners with vehicles. The objections raised were: (1) The cost of new basins at the middle of the block on streets to be paved, where basins were already established at corners; this expense was estimated to be $45 or $50 a basin. (2) The possibility of objections from residents to the cleaning of catch-basins in the middle of blocks. Whatever reason there may have been for the original location at the corners, the commissioner of public works concluded that it no longer existed, and he recommended the change to such an extent as the improvement of the streets would warrant.

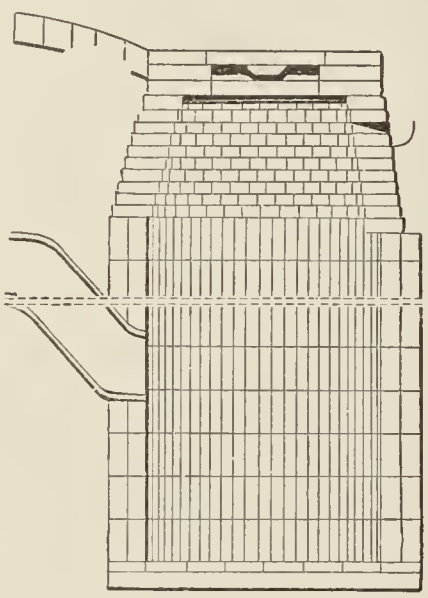


Fig. 1.—Street Catch-Basin.

"To such an extent as the improvement of the streets would warrant," meant that the change could not be made sweeping; the city was poor and could not borrow; it had then, as it has now, a limited supply of funds, and the streets and sewers received only their allotted portions. Some of the wards were in desperate straits because they had little or no sewerage, notwithstanding they were thickly settled, and the residents were clamoring for relief. To take up and remove established catch-basins seemed out of the question; the only thing that could be done, apparently, was to locate the basins where they should be in streets which were newly improved. An order was finally passed to the latter effect on April 24, 1882, but with the additional provision that a special tax might be levied where the catch-basins were already in, to pay for their removal when the streets were improved. The result is that the later-improved and the best streets in the city, including the elegant thoroughfares, Michigan avenue and Washington boulevard, are without the dangerous depressions at the corners, and unsightly accumulations of mud. Experience shows that the mud is not allowed to collect in the middle of blocks, where the catch-basins now are, and that the residents do not offer serious, if any, objections to the new location.

A cut of the street catch-basin, as constructed in Chicago, is given above. (Fig. 1.) At the right is the curb-stone, partially cut away, so that the water apparently flows into it and downward to the opening in the catch-basin. Not only is an unsightly hole thus really out of sight, but the danger of stepping or falling into it obviated. By this contracted and obscure inlet, too, sticks and other large solid substances are prevented from getting into the catch-basin. At the left, the grade of the street is indicated, and lower, on the same side, appears the outlet. The pipe connecting the catch-basin with the sewer is twelve inches in diameter, unless the sewer itself is no larger than that, when this connecting drain is nine inches. The immediate outlet is simply a section of a D trap, which serves as a trap for the basin, the height of the water in the basin being indicated by the dotted lines. Not all the basins in the city are thus trapped; in a considerable number the outlet is a straight pipe, in which cases the catch-basins become ventilators for the sewer; in fact, provision is made in all the basins now built for connecting the crown of this trap with the catch-basin above the water-line, for the purpose of ventilating the sewers. There are, at present, good reasons why this direct ventilation should not be practiced; these will be noticed further on.

As to the construction of the basin, the cut is self-explanatory. From the bottom (inside measurement) to the cover, the height is seven feet and nine inches, and the width proportional. The sides and bottom are of brick, laid in Portland cement, and, in the illustration, a wooden cover is used. In Fig. 2 a sectional view of a perforated iron cover is shown, Fig. 3 showing the same as looked at from above, when in position. The use of iron or wooden covers is not determined by any unvarying rule; necessity—in a financial sense,—and the judgment of the superintendent of the sewer department, settle the matter. Both kinds are actually used.

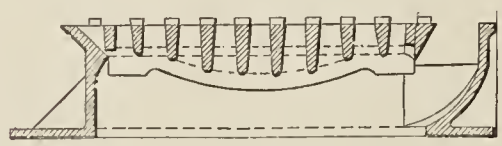


Fig. 2.—Perforated Cover.

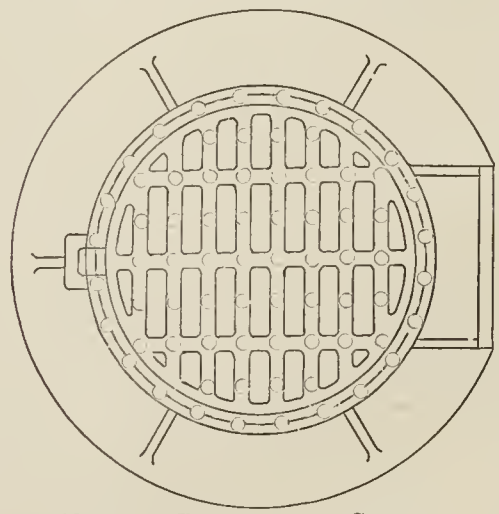


Fig. 3.—Perforated Cover.

THE SEWERAGE OF NAHANT, MASSACHUSETTS.—I.

BY E. W. BOWDITCH, C. E.

The little town of Nahant, one hundredth part the area of Plymouth, was considerably disturbed during the latter half of 1881, and the first half of 1882, by the appearance of typhoid fever in various parts of the town.

The questions then presented for solution were :—1. What was the cause of disease? 2. What should be the remedy? 3. How long would it take to give relief? 4. What would it cost?

The disease being zymotic, the remedies suggested were largely those that would be prescribed by a board of health—cleaning of premises, securing better drainage, plumbing, etc., and removal of all decomposing matters; afterwards trying to better the quality of water, ice, milk, etc.

Without going into details that would prove but repetitions of what may be already fairly well known, the writer desires to call attention in as few words as possible to those portions of the work that may not be so well understood; viz.; separate sewerage, and the apparent recovery of the soil after pollution.

The former of these two subjects is better understood, perhaps, than the latter, although still imperfectly known in this country.

The latter subject, so far as the writer's knowledge extends, has never been discussed in print before, and although isolated cases have been noticed where soil was recovered, to greater or less extent, yet it has apparently either been overlooked, or considered as of small moment.

It being determined to construct a system of sewers, the "separate" system was adopted, as less expensive and quicker to build. It was argued that if manholes were placed at all junctions, and changes of direction, whether vertical or horizontal, it would be comparatively easy to flush with water, or clean with rods, chains, brushes, etc. (See Figures 1 and 2.)

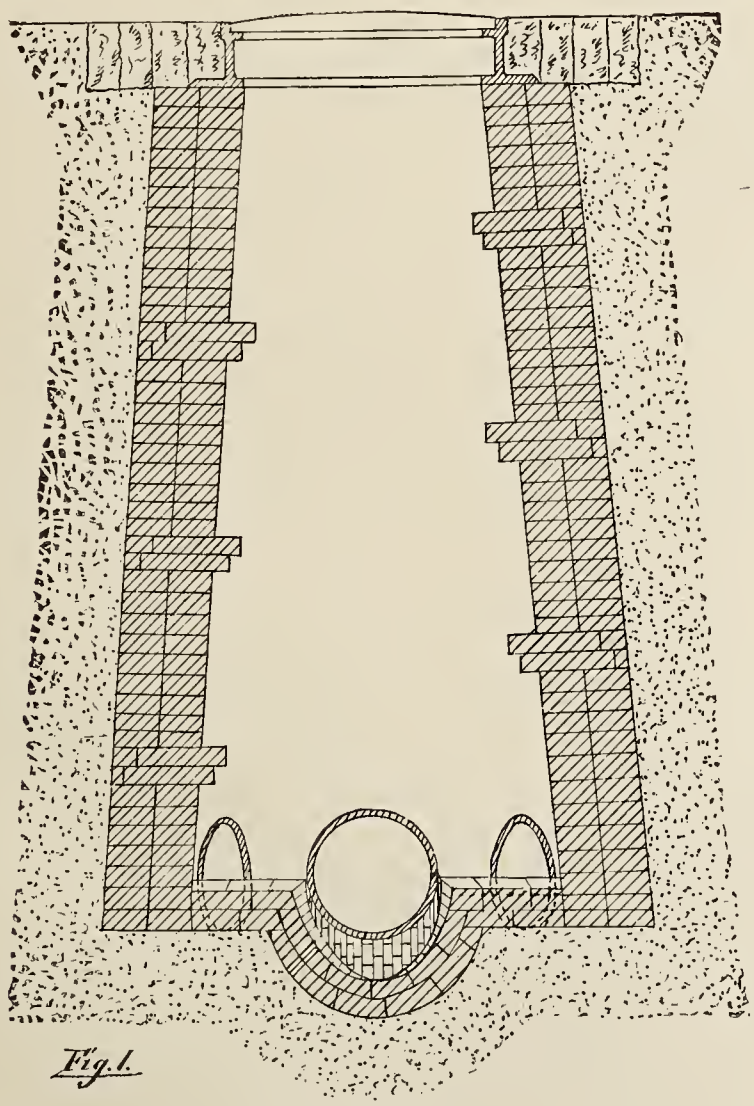


Fig. 1.

MANHOLE SECTION.

On questions relating not only to the preliminary selection of materials, but actual constructive work and maintenance, the writer borrowed freely on all sides, and though usually the methods heretofore employed by other engineers answered the purpose at Nahant, occasionally slight modifications and additions were made that seemed desirable.

Particularly was this the case with the apparatus for cleaning the sewers, and in the arrangement for the ventilation both of sewers and private drains.

The requisite capacities for the sewers were figured on a basis of the area to be served, the proposed grade for each pipe, the velocity of flow of sewage, in every case, and the quantity of sewage that might be delivered at given points during those hours when plumbiug would be in greatest use (between 8 and 10 A. M.). The sizes of pipes, thus determined by calculation, were doubled, so that when in maximum use they would run one-half full. Although many of the lateral sewers, figured on this basis and doubled, should have been four-inch pipes and not larger, the difficulty experienced in obtaining sufficient quantities of pipe of that size, straight enough to admit of inspection between manholes placed 250 feet apart, was so great, that six-inch pipe was selected as the minimum size.

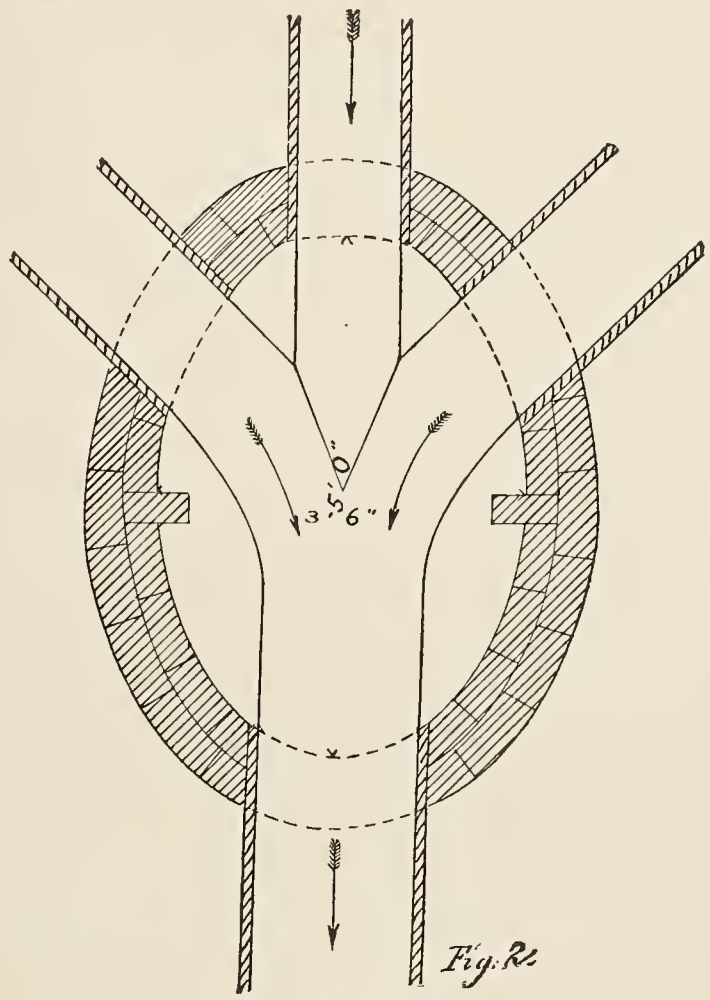


Fig. 2.

MANHOLE PLAN.

Actually constructed, the sewers vary in size from six inches to eighteen inches in diameter, and are, so far as possible, laid with tight joints, excluding all ground and surface water. At the present time, the only water purposely admitted to any of the pipes, other than house sewage, is the rainfall from the roof of one school-house, that covers an area of 1,300 square feet. This was connected, as that part of the sewer was what is termed a "dead end", and received the sewage from one house only.

It is believed that the pipe system at Nahant represents to-day the only thorough system of separate sewers in this country. They certainly can be pointed to as the only system of separate sewers that are operated without public water of any description, and that in certain sections have only a very limited supply of even well and cistern water. From their method of construction, however, as has been shown, every portion of the system is capable of being, and actually is, inspected periodically. Every length of pipe can be examined and cleaned, not only by flushing, but by scrubbing with wire brushes.

THE growing fashion of introducing squares and panels of bevelled mirror glass into cabinets, mantel backs and other pieces of drawing-room furniture, is dangerous unless kept in subjection to good sense and taste. The scattered reflections from these bits of glass are often confusing and unpleasant. Squares and jewels of stained glass can be employed with far better effect. Mirrors may be used without restriction in bedrooms and dressing-rooms, where they have a purpose and fitness. The long swinging glasses are coming into favor again, and bureaus, dressing-tables and walls are more amply supplied with mirrors than they have been of late years.

ESSENTIAL FEATURES OF HOUSE DRAINAGE.—IV.

BY RUDOLPH HERING, C. E.

While I have recommended a fresh-air inlet at the foot of the house drain, I must add that the same object is secured by extending the drain to a sewer without a trap. The air, it is true, will then be sewer air, yet it is not objectionable if the system of sewerage is properly designed and well maintained. It is even of great advantage to the sewers to have them ventilated in this way, and many cities have adopted the plan, for instance, Memphis, Tenn., and almost all the continental cities of Europe. Even in England, where it was strongly opposed, there seems lately to be an indication of a change of opinion. (See report of the last meetings of the municipal and sanitary engineers' association.) In our country, however, where it is more difficult to control the maintenance of sewers, it is advisable to disconnect the house drain from the sewer by a main or "running" trap, which must always be outside of the house, at least three feet from the walls. The fresh-air inlet should lead to a point just inside of the trap so that the entire length of the drain can be swept by the current. It is sometimes advised to extend the fresh-air pipe up to the roof, an escape of foul air at the sidewalk being feared. But there is much less chance for circulation, as the inlet and outlet are nearly on a level, and the columns of air in them are therefore more likely balanced.

The main trap does not require a vent as it cannot be siphoned, except under extraordinary conditions, and then it is always replenished in a few minutes. To guard against the escape of sewer air through the main trap into the house pipe, double traps have been recommended, either with a vent pipe between the two, or a brick shaft covered with a grating, as in England. This is not necessary, however, because with good house drainage, the occasional entrance of sewer-air into the soil-pipe, which is usually at least as foul, cannot possibly cause any trouble.

Where a house drains into a cesspool instead of a sewer, it is far more necessary that the system should be trapped against it, as it emits a constant stream of the very foulest gases. A simple "running" trap however, suffices to guard the house, but the cesspool should have an independent vent pipe lead to an unobjectionable spot.

By the use of such sizes as have been recommended for the different pipes, the various fixtures of the house will generally keep the pipes well flushed and cleaned. It may, however, be desirable under certain conditions, especially when the main drain cannot be given a sufficient grade, to procure a still better means of cleansing them, and for this purpose automatic flush-tanks placed at the head of the flat grade will secure an excellent result.

As to the materials to be used for the drain pipes inside of a house, none should be allowed that cannot give a water and air-tight joint. Outside of it, the danger from leaky pipes is not so great. Vitrified pipes are generally good enough in the latter case, if well laid. Cement and tar pipes have not always given satisfaction, as they are apt to disintegrate in time. Inside of the house, however, they should always be of iron when large, and of lead when small, for no other materials will offer the same security against the possible escape of foul matter. The joints should be made with lead thoroughly calked,—never of cement, as this cracks and crumbles away in a short time. Heretofore, cast-iron pipes exclusively were recommended. Lately, wrought-iron pipes with screw joints (Durham system), and protected against corrosion, are being used in a number of cities with good results, as they can readily be made as tight as steam pipes.

All the pipes should be securely fastened to the walls of the building, and in doing so it is very necessary to consider the effects of settlement, especially in new buildings, and to support the pipes so that their joints will not be strained and caused to leak. A good method of discovering a leak is to paint the pipes with white lead, which would, by discoloration, soon show it.

In order to test a system of drain pipes at any time as to their tightness, several means may be used. The most common is to pour an ounce of the oil of peppermint, mixed with about a pint of water, into the upper end of the pipe and then immediately close it. An observer below will readily discover any crack or opening by the well-recognized odor of the oil. Another good test is to close tightly the lower end of the pipe and all branches below the section to be tested by wooden or rubber plugs, and then fill the pipe with water and let it stand; a sinking of its level indicates the amount of leakage.

Notwithstanding that great care has been given to the design and execution of the drainage work, we should never consider it safe to run overflow-pipes from cisterns containing drinking water or from refrigerators directly into the discharge pipes, even when guarded with a good trap, as there may be times when such a trap from disuse loses its seal. All wastes from the above should therefore first lead into an open receptacle or basin and thence into the pipes.

IV.—Rain Leaders.—It is very commonly desired, for convenience especially, to lead the roof water and often also yard water into the house drains. The effect of a heavy rain cannot but be also very beneficial to the main sewer pipe of the house, if it admits only comparatively clean water. It is necessary, however, to observe certain precautions. As the joints of leaders are not tight, it will not be permissible to connect them directly with the house drain that is not freely ventilated, any more than with a street sewer, without passing first through a deep trap that cannot freeze, as the effluvia would be likely to escape at the joints and be objectionable. In a system of pipes, as just described, open top and bottom, this trap is not necessary, except when the upper end of a leader terminates near a garret window. It is not safe to lead the rain water into soil-pipes, especially when there is only one, for it would necessitate its terminating at the lowest point of the roof, which usually is not far enough from windows. The best point at which to discharge a rain leader is the house end of the main trap, as shown on the sketch, (see page 47, No. 28) because it tends to keep it free from deposit.

V.—Disposal of House Sewage.—A few words should be added with regard to the disposal of the sewage after it leaves the house. In cities having a system of sewers, or where a large running stream is near by, the matter becomes simple. In the first case, the house drain is merely extended to the sewer and should there be discharged at as high a point as practicable and at an acute angle with the flow. In the second, it is necessary to carry the pipe a short distance out into the stream to prevent the sewage from dragging along the shore, and discharge it under water, an opening for ventilation being provided at the bank.

Where neither of these conditions exists, the sewer may discharge into a cesspool, situated below and distant from the house, until a better means of disposal can be provided.

For country houses, hotels, and isolated residences, in general, the best and most successful plan is to collect the sewage in a closed cistern and discharge it periodically through a flush-tank into a series of small tile pipes laid to a gentle grade, from eight to twelve inches below the surface. By extending these tiles over a sufficient area, and allowing from forty to seventy feet of tile for each person, a complete absorption of the sewage takes place by the action of the atmosphere and roots.

VI.—Subsoil Drainage.—A consideration no less important than the question of sewage removal, is the maintenance of a dry soil under our dwellings. The best preventive of damp cellars is the thorough cementing of the entire floor and walls sufficiently to make them perfectly water-tight. This method is in fact almost the only one left to us in our large cities.

Where it is possible to find a safe outlet for a drain pipe, situated several feet below the cellar bottom, a series of tile drains may accomplish the same purpose. Great care must however be taken to prevent any back flow from the point of discharge, which, if this is in a sewer, would be exceedingly dangerous. A secure trap and a disconnecting open vent carried up to the surface outside of the building will generally suffice. In country residences a safe outlet can almost everywhere be readily obtained and the trap is not necessary.

Before closing, I have one more point to mention bearing upon the subject under consideration. The fact that the principles of house drainage are simple does not imply that every house-owner or the person he employs is able to plan and supervise the execution of the work, as past experience has amply shown. As the community should be anxious that all the dwellings are well sewered, for their individual benefit as well as to give security against ill effects of bad work on neighboring premises, it should therefore be the duty of the community to establish proper regulations and to compel the work to be done in accordance with them by capable persons. In the last few years, quite a number of cities have adopted such rules with excellent results and there is every indication that the same laudable movement will be generally continued.

The degree to which regulations can be made to cover the entire work, depends on local circumstances. It is practicable in all cases to have a registration of sewer connections, showing which buildings dis-

charge into public sewers and exactly where and how they do so. It is further practicable to have a record of the location and depth of the underground pipes, extending from the street into and through the building lot, filed for reference in case the owners desire to make new attachments or alterations, or when stoppages occur which require an examination. The benefit of such records is seen in the city of Providence, R. I., where they have been kept for years and where owners make considerable use of them. It is also practicable to have an inspection of the drainage pipes made by a municipal officer who can certify to their arrangement being in compliance with the city's regulations.

So much can and ought to be done everywhere, for the safety, convenience and comfort of the public. It is gratifying to notice the growing success of the endeavors in this direction, and the effect it has had in seeuring greater skill and intelligence among the plumbers, and lessening the blunders and imposition of the incompetent ones.

In the short time allowed for the consideration of so large a subject, at a gathering representing so many interests, it is naturally impossible to do full justice to it. I trust, however, that I have conveyed a clear idea of the essential points to be kept in mind. Their further justification and elaboration can be found in the recent literature on the subject, notably in E. S. Philbrick's work on "American Sanitary Engineering," and in W. P. Gerhardt's report to the state board of health, of Rhode Island, on house drainage and sanitary plumbing, which give the most praeticable and most reliable information to be had concerning the treatment of the question under American conditions.

[The following paragraphs were unavoidably crowded out of place in making up the article. They belong at the end of that portion of the article printed on page 36–37, December 1, 1883].

An intelligent comparison between the above experiments must, I think, result in the opinion, that, in general, it is not safe to omit the separate ventilation of the traps. There may be cases where the tendency to siphon is so small that a seal of 1½ inches will resist it. Such cases are, for instance, wash-basins, especially when in the upper stories, as they are not far from the upper opening of the soil-pipe; or, by the use of meehanical traps, security may be gained for small receptacles under favorable conditions.

Water-closets, slop-hoppers and bath-wastes, however, should never be without trap ventilation. A eareful examination of the conditions presented in each house will alone decide as to whether any of the remaining receptaeles require it or not.

The special vent-pipes from traps are best carried directly to the roof, as the air in them is no better than in the soil-pipe. One such pipe may ventilate the traps situated above each other on different floors. It is, however, perfectly safe to carry it into a waste or soil-pipe at a point just above the highest fixture. When its diameter is great, the diameter of the soil-pipe should be eorrespondingly increased above the junction.]

Thanking you for the kind attention with which you have received my lengthy and no doubt somewhat tedious remarks, I commend them to your serious eonsideration.

THE OVERHEAD VENTILATION OF SEWERS.

BY WILLIAM OLDRIGHT, A. M., M. D., OF TORONTO, CHAIRMAN ONTARIO PROVINCIAL BOARD OF HEALTH.

[Read before the American Public Health Association at Detroit, Michigan, Nov. 13–17, 1883.]

The object of the brief paper which I am about to read is to obtain a consideration by this association of the question whether it is preferable to discharge sewer-gases, as is now done in many of our cities, into our streets on the ground level, amongst wayfarers, who are continually passing over the street ventilators and on all sides of them, or to discharge them at points above the top of our houses ; and in considering it we must bear in mind that in the latter case the gases are to be distributed through a large number of outlets at short distanees apart, whereas in the former they are discharged through openings few and far between, and are, therefore, much more concentrated and injurious.

Let us leave out of eonsideration all side-issues, which, though germane to the subjeet, have no more bearing on one side than on the other of the partieular question proposed. I know some will say : "Attack the main cause of trouble, the existence of decomposing matters in sewers." So we should ; but there still remain gases in sewers, and the question now before us is, What shall we do with them ? The numerous defects to be met with in house plumbing, and the means for preventing sewer-gases from passing into our abodes, through the drain-connections, have a very important relation to our subject ; but, as these have been fully treated by various members of this association, and I have recently expressed my views on them in an address reported in the annual report of the state board of health of Michigan for 1882, and more fully in the latter half of a pamphlet on "The Disposal of Sewage," published a short time ago by the provincial board of health of Ontario, I do not intend to take them up at the present time, for it will be readily admitted by all that, so far as the interiors of our houses are concerned, the plan which should be adopted is that which will secure the greatest immunity from the presence in drains inside of houses of noxious gases in concentrated form.

Let us then address ourselves to the consideration of the question whether sewer-gases should discharge at the level of the road-bed, or into the air above the roofs of the houses. I do not think it will be necessary to spend time in impressing upon such an assemblage as this the fact that to inhale the gaseous contents of sewers is not conducive to health. Even if a system of sewerage be so well conducted that the sewage is removed from it (changed) every twenty-four hours, I do not think we can say there is no danger from inhalation of gases from the excrementitious products and washings of persons ill with infectious diseases. I may, however, call to the attention of some who may not have noticed it, a report by Mr. Sedgwick Saunders, published sometime ago in the *The Lancet*. He attributes to sewer-gas, arising from the ventilators in the road-bed in some of the narrow streets of London, cases of typhoid fever and sore throats, and he "suggests an abatement of the evil by the closing of the street ventilating-gratings entirely and the erection of upright shafts, six inches in diameter, to be carried above the roofs of the adjacent houses." I am sure that it has occurred to many of us to notice the disagreeable odors that cometimes arise from the street gratings or from the unsealed traps of gullies. Sometimes, too, we arc more than usually impressed with the reality of the exhalation of sewer-gas by the sight of columns of vapor arising from these gratings and gullies and rendered more visible by the condition of the atmosphere on a cold damp day ; but we should bear in mind that gases proceed from the sewers even when they are not apparent to sight or smell, and that they are often aceompanied by germs.

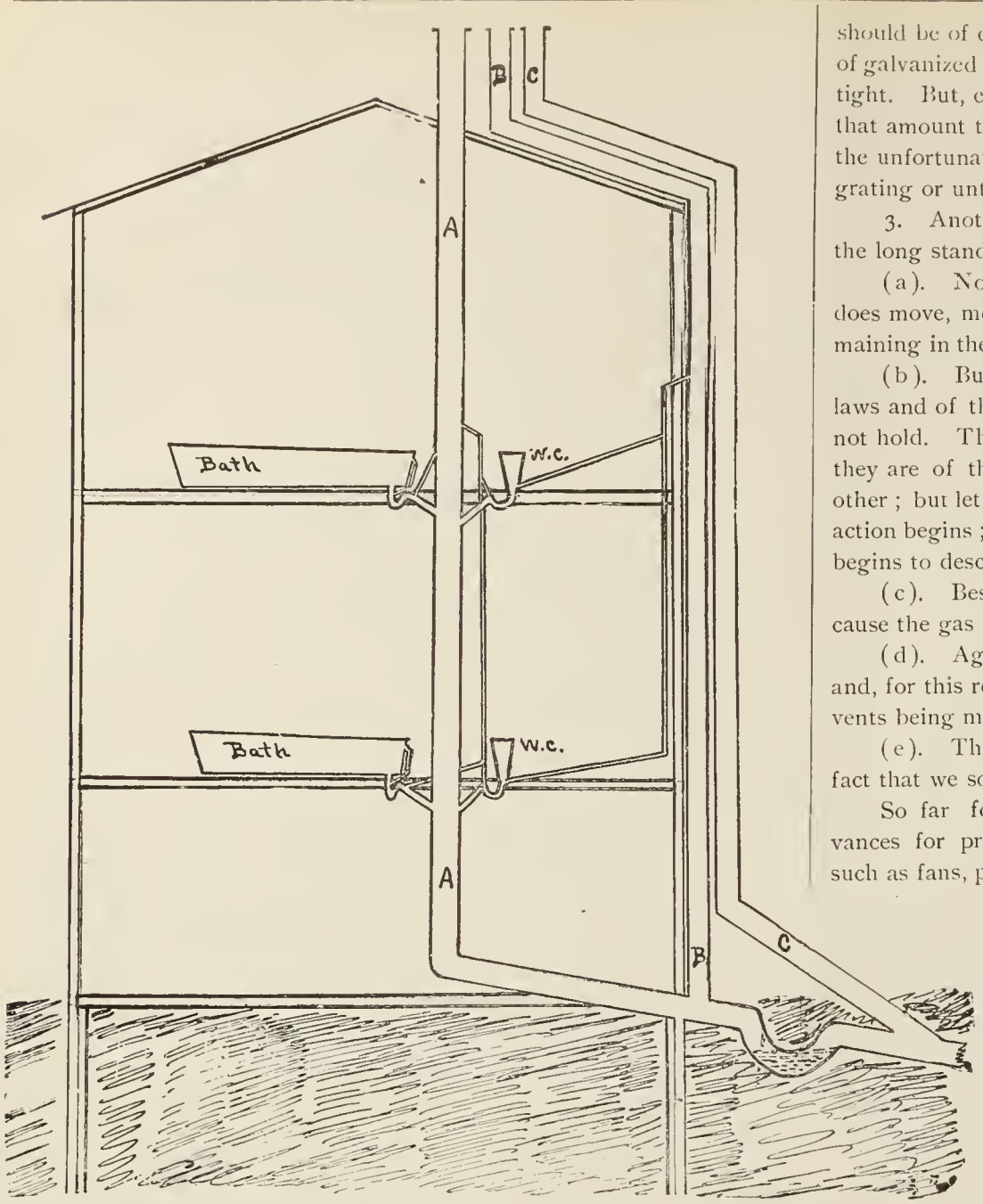
Some speak of the placing of charcoal-trays in the ventilators as a sufficient safeguard. Even were the charcoal constantly dry, sewer-gas at times makes its exit too rapidly for the charcoal to exert any action upon it. So that, however useful an adjunct charcoal may be, it cannot be considered a preventive to the injurious effects of sewer-gas.

But even were there no objection to the method of ventilating by gratings in the road bed it is not to be relied upon in winter time. The gratings become clogged or closed by ice and frozen mud.

Hence, it seems evident to me that the prineiple which is now being advised and adopted by leading sanitarians and architects for the safety of the individual householder in regard to his house drain ought to be advised and adopted by sanitarians and engineers for the safety of the whole community in regard to the street sewers. A four-inch pipe (C) should be carried from every house drain to the roof of the house which the drain is intended to serve, and should diseharge the sewer-gas at a sufficient distance from all chimneys, windows, doors, or other openings into the house. Between this pipe and the sewer no trap should intrude. It would, in my opinion, be better to have a trap between the pipe and the house, provided that, in addition to the extension upwards from the soil-pipe (A), there is another four-ineh pipe (B) forming a counter opening and allowing a current of air to circulate freely through the house-drain and its connections and vents, as described in the pamphlet before referred to and illustrated in the accompanying diagram.

If the health authorities do not wish to risk the odium of thus forcing good health upon the inmates of houses at once, they ought themselves at least to place, at the expense of the corporation, pipes at distances proportionate to the spaces measured off by the sewer-gratings, and might pass a by-law requiring that a pipe shall be connected with every new drain, or other drain that shall require to be reopened, and that within a reasonable time all drains shall be provided with them.

The desirability of some such method of disposing of the gaseous contents of sewers seems so apparent that we feel as though we should call upon municipal authorities to show cause why they do not adopt it (if we may borrow a phrase from the courts of law). Let us examine some of the pleas entered in opposition to the proposed reform.



Sketch showing Method of Overhead Ventilation.

1. One objection I have heard made by some civil engineers is that, inasmuch as house-drains do not usually enter the sewer at the highest point of the latter, there is a space in the crown of the street sewer that cannot be ventilated through the house-drain when the water in the sewer is higher than the mouth of the drain.

To this I would answer that as there is nobody in the crown of the sewer to be injured it would seem as though nobody would care whether there is confined air there or not; if the pressure becomes very great the gases will be dislodged and will bubble off at a point higher up the line of sewers, where the drains are not water-locked and where they will find an escape. Most sewers allow for fluctuation of their contents, and it is only at times that the house-drains will be so full as not to allow of counter-currents and through-drafts.

But the ground of this objection furnishes a very strong argument for the overhead ventilation through house-drains; for, when the water closes the mouth of the house-drain, and that rises higher still in the house drain (as well as in the sewer), what is to become of the gas imprisoned in the drain itself, if there be no vent between the sewer and the traps, the pressure being such as will force the latter? We know that a three-inch seal only offers a resistance of a quarter of a pound for each square inch of surface. The answer to this first objection is partly the answer to the second.

2. The second objection to which I shall refer is that it is not safe to carry sewer-gas through a pipe in such close proximity to the walls of a house, as some of the gas might escape from the pipe.

(a). It is only safer to have it pass through a pipe outside the house than to have it forced in undiluted form into a pipe inside the house.

(b). It must be remembered that, with the present system of half-clogged and infrequent openings, the contents are much more concentrated.

(c). In further answer to this objection, I would add that the lower part of the pipe, from the drain to a point a few feet above the ground, should be of cast-iron dipped when hot into melted pitch, and above that, of galvanized iron, which, with a good coat of paint, will remain perfectly tight. But, even if a pin-hole had existed here and there, what would that amount to in comparison with the pleasures of gas wafted toward the unfortunate houses which happened to be situated opposite a street grating or untrapped gully?

3. Another objection made is that air will not enter the sewers down the long stand-pipes.

(a). Now I would again answer that so long as the gas, when it does move, moves off overhead, we need not so very much mind its remaining in the sewer for awhile.

(b). But, as a matter of fact, a careful consideration of pneumatic laws and of the forces acting in sewers will show that the objection does not hold. The columns of gas or air in opposite sides of the street, if they are of the same temperature and density, will counterbalance each other; but let the sun shine on one side and immediately an ascensional action begins; or let a cold wind blow on the other, a cold dense column begins to descend.

(c). Besides, the rising and falling of the liquid in the sewer will cause the gas to be expelled, or the air to be drawn in.

(d). Again, the air will blow up the sewers from their mouths; and, for this reason, flaps should never be placed on the mouths,—free vents being made all along the course of the sewer.

(e). The plea that the gratings are needed for inlets is met by the fact that we so often find them exhaling gases.

So far for objections. I need not refer to the various contrivances for propelling air into sewers and extracting gases from them, such as fans, pumps, steam-jets, and furnace chimneys. They are costly and alone, are insufficient and unsatisfactory. When plenty of free vents and good traps exist they are unnecessary, and when these do not exist they are dangerous, inasmuch as such propulsion will force traps, and such extraction will empty them by suction where free vents do not exist.

The true plan seems to be to make plenty of breathing holes, plenty of channels through which currents will continually pass, and which will discharge gases at a safe distance overhead.

I find that, in many of our larger cities, sewer ventilation is quite insufficient and faulty. I find, too, that much apathy—or rather a want of appreciation of correct principles—is found in regard thereto, even among men who are earnest and well versed in matters of sanitation generally. I have therefore thought it a subject which should receive consideration at this meeting.

PLUMBING OF TO-DAY AS COMPARED WITH THAT OF THE PAST.—II.

BY DAVID WHITEFORD.

The plumbing trade is different, in some respects, from most other trades. We are pre-eminently the servants of the people, ready to do their bidding at a moment's notice. We are to the people, in a certain sense, what the physician is to them. When a person is sick he calls the doctor. Just so when a pipe bursts, the householder calls the plumber; if the plumber is not in he "cannot wait," and off he goes for another. The people are not always sick; neither are there pipes always bursting; nevertheless, if we wish to keep our customers and induce others to employ us we must have men, and these men must be paid; and, unless we have a good deal of new work on hand, it is sometimes hard to know what to set the men at. If, on the other hand, we keep no men and attempt to do all the work ourselves, we had better shut up shop and go to work as journeymen, for, in doing so, our pay will be much better. Therefore, I say that our charges ought to be higher in proportion than those of other trades. Furthermore, is not the public health and weal in our hands? If our work is not well done, what is the result? The result is we kill the people. Then, I say, if we must maintain good mechanics to do the work we should have a fair remuneration for our services.

The immense stride which has been taken in the plumbing art itself, of late years, is best indicated, perhaps, by the numerous improvements that have been made in the materials used, and in the way of their manufacture and appliance. Where, for instance, are the old hand-made traps,

offsets and bends of a few years ago? Indeed, there is scarcely any article in use that we cannot now buy cheaper and better than we can make it. I do not suppose that there is a master plumber in Chicago who would think to-day of putting any of his men to making traps. From experience and observation we have all seen the defects of the hand-made article and are willing to set it aside as a relic of the past. Too often have we had to take them out split open along, or near, the seam. I am told that in some parts of the old country plumbers still make them and put them in, thinking, I suppose, like Demetrius of old, that they are in danger of losing their business. Speaking for the plumbers of Chicago, I think I can say truthfully that we believe in adopting and putting in use the very best and most improved materials we can find, no matter what may be their cost. We believe in the Dubois trap, or any other as good, with a brass ferule, and well connected to the iron soil-pipe, with good ventilation. We believe in good workmanship ; and in the latter we certainly equal, nay, excel, any other city and any other country in the world ; and, in my experience of twenty-eight years in the business I do not know that I have ever seen better workmen than we have at present. In a recent issue of a New York paper, the comparison was drawn by a writer between the English and Chicago plumber in regard to the matter of wages, showing that the advantage was on the side of the Chicago plumber, so far as the figures are concerned. I think the comparison was correct ; but, I believe the work done in a day by a workman in Chicago (and I do not exaggerate) equals that done in a day and a half by the workman either in England, Ireland or Scotland,—and what applies to the journeyman applies equally to the master ; so that the question may be raised, Do we indeed, on this side of the water, receive more money for our labor than is received by our English brother? What I have stated are facts, as I was myself an eye-witness only a few years ago ; and the statements are corroborated by another of our members, who has recently visited those places, and, also, by one of my own men who has gone back to the old country, never to return, because, he says, we are always in a hurry here ; all it is, is eat, sleep and work, and no pleasure.

One of the great evils growing out of this dreadful hurry is the desire—and it is a legitimate desire—to get work and get all we can. This is found true in all trades, especially that of carpenters. Not long ago I had some new buildings in which to do the plumbing and gas-fitting, and one week before the roofs were on the buildings the carpenters were laying floors. What time was given the plumber and gas-fitter to put in his pipes and prove them? None. If you ask the carpenter to leave even one board loose, in laying the floors, the answer is : " I have no time ; you ought to have put in your pipes before this; no provision having been made for lead pipes, put them in as best you can." In a few weeks the house is plastered, and before the putty coat is on, the carpenter sub-lets the trimming of each building to separate contractors. and in less than one week, and before the windows or doors are in place the painters are ready to do their work and waiting on the plumber. They will leave no boards loose ; they will do no cutting of joists or floors ; and if you ask them to put up boards on the wall on which to fasten the pipes, or even to set up sinks, the answer is : " I will if you will pay for them." I ask, who can do good work with such hindrances in his way? If the plumbing is bad, who is to blame? How often you find, when the carpenter work is finished around the bath-tub, closets, etc., that they have left no possible way of getting at the pipes and fixtures for repairs. These are a few of the evils we have to contend with at the present time. Years ago, all the cutting was done for us, and when we asked.

But to return to the matter of improvements: Only a few years ago lead soil-pipe was used exclusively; now, we use iron, the reason for the change being that the latter is proof against rats and against the nails of the carpenter, and, because it was difficult to support lead. Expansion and contraction, corrosion and strain from the settling of the building, would split it open. Cast-iron pipe I believe to be better, but it ought to be somewhat thicker than that which we have been using.

Ten years ago, but few bath-tubs, closets and wash-basins were safe-lined underneath and furnished with safe pipes. I have seen them lined years ago, and with safe pipes connected to water-closet traps; but that was bad practice, the cure proving worse than the disease. Very few houses are built now, however, that do not have all the fixtures, and with safe-pipe attachments. The hydrants, which were made then and stood inside the fence, are seldom put in now, almost every building having the water-pipes taken to the inside of the house, and being furnished with sinks and separate traps, up and down stairs, with waste-pipes to a good earthen sewer and carried through the roof, as it ought, of course, in every case to be.

The water closets in use in Chicago, until about ten years ago were the cistern and pan, valve closets; but now their name is legion,—the Jenning's, the Zane, the Alexander, the White, the Hartford, the Victor, the Tidal Wave, the Brighton, the Kelly, and a score of others. It must be said, however, that while each and all of them have some special merit, perfection has by no means yet been attained. While the cistern closet has a better flush than the valve, it has the same objection that belongs to the latter on account of the space required for the pan to work, leaving too much foul matter in the trunk. The Zane closet, with some of the others, has the necessary quantity of water to flush it, yet, when you remove the cover to the reservoir and look inside, you see its defects at once. In some of the others I believe we are approaching the true principle, though you will understand I am not at present advocating any of these but simply expressing my own opinion in the matter. I believe the true system of a water-closet to be a tank with a 1½ or 1¼ inch discharge-pipe to flush the bowl—glass bowl,—and to hold not less than 2½ gallons at each discharge. A few evenings ago the question of waste of water came before the association. In this matter I believe there is an excessive and a useless waste of water. What good is the trickling of water down a soil-pipe with the handle propped up? The advantage is only to admit bad air into the house, especially if the soil-pipe is not ventilated. Another great waste of water is in the check and wastes. Hundreds leak all the year round, the water breaking the sewer joints and entering the sewers. For myself, I believe in the meter system. The thing to do would be to put a meter into every building at the landlords' expense, and let the water-tax be paid by the tenant. If the meters could be made to cost not more than $20 or $25, and they were put in all over the city, we would have the benefit of twice the quantity of water at the present expense.

It might be here added that one thing which is very much needed in Chicago is a system of public water-closets and urinals. I have been repeatedly asked on the street, by strangers, where they could find such conveniences. Of course, Rome was not built in a day; but the time has more than come when our city should be amply furnished with these accommodations, they should be well distributed and should be under charge of a keeper, responsible for their care.

Other improvements in the work might be dwelt upon, but they are too numerous to notice in the present essay. I may be 'pardoned, however, if I mention one little article in the form of a tool, which, perhaps, every plumber among us now uses. Previous to 1867, as near as I can remember, in laying water-service pipes in the street from main pipes to curb, we had to dig across and between the car-tracks, causing much inconvenience to the public and expense to the car company. Sixteen years ago, Mr. Verity and myself had some contracts from the city to lay water service pipes in the street for every empty lot, laying the pipe under the area walls. We were nearly compelled to abandon the contract on account of water in the area walls; but by using an auger we drilled under the wall at least twelve feet and put in our lead pipe; now, the auger has become an indispensible article to the trade. It may have been used previous to this time but we had not seen it.

Another thing that I will mention which may be of some value, some of you may possibly have seen or done. During the summer you are aware that the city water does not rise in some parts of the day to the higher stories of our buildings; and in factories where they need water every hour of the day, it is a great inconvenience as well as an expense to carry it. On this account, you also know it is necessary to put up a tank on the top floor to catch water during the night. My device is automatic. Previous to its construction I had never seen anything that would do the work. The arrangement is this: We will suppose that there are a water-closet, sink and urinal on each floor,—say two or three floors. During the night the tank fills by a ball cock attached to the same pipe which supplies the various fixtures on each floor. In this way the water flows back from the tank into the same supply-pipe. I then tap the bottom of the tank, and connect it with the tank supply-pipe, putting in between the tank and the point of connection a check-valve. When the pressure of the water from the city main is greater than the pressure from the tank, the check-valve closes and the tank fills by the ball cock, and vice versa. On the other hand when the pressure of the tank is greater than the city pressure the water descends and supplies the fixtures. Finally, in order to prevent the water from passing back into

the main pipe, or to the lower floor, I put in another check-valve, just above the point to which the city pressure rises during the day.

I have already made this essay much longer than I designed. In conclusion, let me add that, while in the past and, particularly, in the last few years there has been a marked advance in the art which we delight to call our own; while, indeed, its progress has been equal to that in any other department of mechanical or scientific enterprise; while, in a word, it has kept pace with the nineteenth century; and we must admit we are much indebted to *The Sanitary Engineer*, The Sanitary News and the men who, by their superior advantages, have demonstrated to us many things in relation to our business which it would have been almost impossible for us to have known; yet let us remember that here, as every where else, there are heights beyond, and to the scaling of these let us ever be devoting our best and noblest energies. We are followers of a worthy calling. Let no man, then, in these days be ashamed to have it known that he is a plumber. His is a trade which requires not only the cunning of the hand, but the skill of the intellect; and if in the years that are to come we shall see still more marvelous advancement it will be because there has been with you and with those who follow us not only sweat of the face but sweat of the brain.

THE PHYSICIAN AND THE PLUMBER.

A special meeting of the master plumbers' association of Chicago, was held on Wednesday evening, Dec. 19, at their hall, a large number being in attendance to hear the lecture by Dr. Oscar C. De Wolf, health commissioner of Chicago. In introducing Dr. De Wolf, President Young said: "It is a great pleasure to me to have the honor to-night of introducing to you the distinguished gentleman who will address you this evening,—a gentleman whose fame as an efficient health commissioner is world-wide, and whose efforts and labors in the cause of public sanitation have been for years ceaseless and untiring. In behalf of the master plumbers' association I heartily thank him for the aid and encouragement he has given our efforts to raise the standard of plumbing in our city; and, should our city be visited by an epidemic of disease, I ask him to call upon the master plumbers' association, and I pledge him our presence and assistance in any capacity he may see fit to use us for the public good."

THE PHYSICIAN AND THE PLUMBER IN THEIR RELATION TO STATE MEDICINE.

Having been thus pleasantly introduced Dr. De Wolf spoke as follows:

Mr. President and Gentlemen of the Master Plumbers' Association:—I have accepted with much pleasure the polite invitation of your committee to meet with you this evening for two reasons. (1). Your work and its results are intimately associated with my own; and (2) I believe in association and associated effort in every sphere of life. No matter how learned, no matter how worthy, no matter how enthusiastic the individual, he will fritter away his time and strength by attempting alone and unaided to move the wheels of any industrial or social or professional enterprise. Association means power; association means an upward and forward educational movement; association means dignity, and you will be in accord with me when I say that your art needs every one of these qualities and conditions to place it where it belongs, in its proper sphere of usefulness, and in an accredited and recognized position. I am glad of the opportunity to add my words of encouragement to aid you in the consummation of your desire, and shall speak to you of the physician and the plumber in their relation to state medicine.

The term medicine conjures up to the mind of one who is not a physician, many curious images. It suggests to him his youthful days when surreptitious indulgence in a diet of green apples was followed by the infliction of a nauseous dose recommended as peculiarly palatable. Doses and medicine are in consequence in many minds synonyms. The jokes leveled at medical men turn upon the administration of medicine, and alliances with the undertaker. Dickens, usually partial to physicians, for example, says of Jobling the surgeon, and Mould the undertaker: "It was a great point with Mr. Mould, and a part of his professional tact, not to seem to know the doctor, though in reality, they were near neighbors, and often, as in the present instance, worked together. So he advanced to fit on his black kid gloves as if he had never seen him in his life; while the doctor on his part looked as distant and unconscious as if he had heard and read of undertakers, and had passed their shops but had never been brought before into communication with one." Such ideas and such pleasantry have in some measure conduced to the not peculiarly ennobling views held by many persons concerning the office of medicine; a view held in defiance of their welfare and of common sense.

The man who would grumble at being told by his physician to abstain from an over indulgence in food or alcohol, or, being informed that his ailment comes from a defective soil-pipe in his house would growl at the rapacity of plumbers whom he must employ to repair it, would not object to paying for gallons of patent medicine nor refuse to take prescriptions in unlimited quantity. Medicine, like religion, in many minds trenches on the unknowable and is therefore a fair subject of theory. Volunteer medical advice, like a motion to adjourn, seems to be always in order. In the minds of the majority of people the province of the physician is limited to the use of drugs and the treatment of disease, and too many men professing to practice medicine, entertain the same idea and profit by its results. To conceive of medicine simply as the art of giving drugs leads to a degrading conception of medicine as a trade in human suffering. There is a homely adage containing the crystallized experience of many years of suffering and consequent reflection, which says, "an ounce of prevention is better than a pound of cure," and on the principle so roughly yet succinctly set forth is based what is known as state medicine. What *is* state medicine? As regards the dimunition of human suffering it has been and is destined to be the most fruitful branch of medical science. Everything which prevents human suffering and increases the duration of human life comes under its purview. The causes of disease and the means of destroying these causes; the influences which aid and stimulate the progress of disease and the means of modifying or removing them; the agencies which lower human vitality and the means of increasing this vitality; the means of securing food of good quality and free from adulterations; the erection of dwellings in such a manner as to secure for their inmates fresh and wholesome air, pure water and the proper means of disposing of waste products cast off from their bodies; these and many of the allied matters which bear upon them are the subjects of the state physician's care. He is therefore forced to call to his assistance not only all the resources of medicine, but the aid of the chemist, of the lawyer, of the architect, and of the practicer of your own art.

He has to meet the opposition of the avaricious landlord, of the ignorant tenant, of that large number of people to whom change is repugnant, and of such men in the practice of medicine as regard their professional labor from the mercenary standpoint alone.

It may be asked "What has state medicine accomplished for the world thus far? In former times men lived longer than they do now." Oh! this is a grave popular error; the one man who lived to be old is remembered; the hundreds who died before their fifth year are forgotten. The golden age of health cannot be placed in the past periods "where men died faster in the purest country air than they now do in the most pestilential lanes of quiet cities, and where men died faster in these lanes than they now die on the coast of Guinea."

What has state medicine done for the world? Mr. Chadwick answers, "By modern sanitary work covering the sites of cities and large towns, their proper drainage and sanitary policing, their water and food supply, and by the active sanitary supervision of the work-shops and homes of all classes, we have gained the power of reducing the sickness and death-rate in our larger cities by at least one-third."

The health of London was practically stationary for the thirty years ending 1870, but such marked improvements were made during the succeeding ten years that in 1880 there were 74,000 children of school age amongst the poorer classes living in 1880, that would have died had the mean death rate of the thirty years previous to 1870 been maintained. Seventy-four thousand children saved in ten years in the city of London is one answer, and a very brief and narrow one, to the query, What has state medicine done for the world?

Amongst the most important questions with which the state physician has to do is the proper construction of conduits through and from or dwellings. Here the physician and the plumber meet, and they should alike be actuated and controlled by sentiments of honor and enlightened professional duty.

Like the physician, the plumber is made the butt of many witticisms. His enormous bills, his rapidly growing wealth, and his proposed trip to Europe furnish the newspapers with themes which amuse their readers at the expense of your guild.

In my opinion the responsibilities resting upon you are greater than those resting upon any other class of skilled handicraft. You may be the means by which the most atrocious diseases are directly introduced into a household, or through your instrumentality the vitality of the inmates may be slowly sapped and the soil prepared in which destructive agencies will flourish like the Upas tree. On the other hand your skilful services may do more to restore health to such a family or community than all the drugs to be be found in the pharmacopœia. You cannot therefore put aside the fact that the practice of your art is something more than a mere matter of dollars and cents; a return of so much money for so much labor and so much capital, but it involves human life protected or jeopardised, human suffering and woe diminished or augmented. I leave the question with you, has this responsibility always been recognized?

Dr. Vallin, editor of the Revue d' Hygiene, says "Plumbing in the English speaking countries is passing from among the trades and taking its place in the industrial arts." I believe this is true, and I congratulate this city, I rejoice myself, that this sentiment has so actively impressed the thoughtful minds of the calling in our midst that the master plumbers' association of Chicago exists, and in my judgment is to exert an influence in the next five years which is to-day hardly contemplated. Your association is a testimony to the fact that you recognize the change that this progressive age is stamping upon your calling and of your desire to take it from the ranks of trade and place it among the industrial arts. It is a legitimate and enlightened desire, but while it adds dignity to the calling it brings increased responsibility, and these responsibilities it is the duty of your association to meet.

You will infer that after years of service in one way or another, near or remote, devoted to sanitary study and labor, I have come to entertain some crystallized notions regarding the personnel of the plumbers' trade as it is called, and of the measures necessary for its advancement to the position you desire it should occupy. In discussing the questions suggested by this remark I shall be sure of your courteous attention even if I fail to receive your assent.

I recognize three classes of plumbers,—(1) The skilled artisan, honorable, intelligent, reliable. (2) The men who may be designated as "botches"; men who, because they have learned how to use a soldering iron, call themselves plumbers; men, who not only injure the reputation of honest work and honest workmen, and imperil the health of communities, but also increase the popular rage for the "cheap" in place of increasing the demand for the "good." Men who diminish the remuneration which conscientious and thoughtful workmen *should* receive—and must receive by teaching the public that plumbing which is cheap answers all purposes. (3) The so-called "practical men," who as Hellyer says; "having learned the plumber's trade in their youth have learned nothing since, and are totally unconscious of the fact that plumbing like the other arts has advanced with the general advance of science." This class act in a similar, though at first sight seemingly less injurious, manner as the "botches." That they do as much, if not more harm, than the botches, to the reputation of the plumbing art cannot be denied. Their work is done, from a purely mechanical standpoint, better than his, their blunders are not so soon detected, but they do more to confirm the public in a taste for the cheap in place of educating it into an appreciation of the good.

A so-called practical plumber is generally like other self-called practical individuals the most impracticable of human beings. Improvements not fitting in with theories which, being moss grown and ancient, have in his opinion become transmuted into facts, are objected to and sneered at because they interfere with his ideal (to-wit) work as good from a mechanical standpoint as is consistent with cheapness.

Now, how much harm is constantly done to the reputation of honest, progressive and able plumbers by the work of these two classes cannot well be estimated. It is not the snide workman, the botch, the cheat who alone suffers by the work he does. If it were so, the dishonest might be cast out and that would be the end of the matter; *but it is not so;* to the public a plumber is a plumber, and when a botch putties up a joint in the soil-pipe which by and by breaks away, floods the house with emanations from the sewer, and, as a result, a child of the household lies dead with diphtheria, the father will not confine his denunciation to the scamp who did the work, but damns the whole craft.

Macaulay says "bad men suffer first from laws which are afterwards perverted to oppress the innocent," and so, when the health commissioner finds himself obliged to prosecute a snide plumber for designedly making bad joints in his work, the guilty man is punished with fine, but the whole guild suffers by an unreasonable thoughtless public sentiment which carries along the crime of one into the honest work of the other and thus the personal honor and reputation of the innocent are soiled. Now, what is the position this association should assume to secure its highest usefulness, protect the public against fraud and thus conserve the general health.

To my mind state medicine may step in here to your aid.

The art of the plumber, like the art of the apothecary, should be conducted according to certain requirements established by law.

The first means which naturally occur to the American mind, are to inflict penalties for violation, but the infliction of penalties alone will not remedy great evils; more must be done, and that something which has been most strongly urged is the American panacea for all social evils—education. Dr. Corball says, educate the plumber so that he shall have a thorough knowledge of his business and require of him before he is allowed to undertake the execution of any work, to have a license from a competent and honest board of examiners and to register his name and place of business before the proper authorities.

Hellyer recommends the establishment of a school in which the art shall be taught, and that the apprentice who has pursued a full course shall receive a diploma stating the grade and standing of the person who receives it. That there should be a more thorough education of the plumber in his art no reflecting mind will feel inclined to deny, but that Hellyer's suggestion is the best that can be thought of will be very naturally questioned. If the honest and able practitioners of plumbing are disgraced and degraded by botches and "practical men," they are also much annoyed by the honest apostles of change, whose zeal carries them beyond their knowledge and who are wafted about by favorite theories and impracticable ideas. This class—honest men as they are—would be largely increased by a school system of education, for such a system always tends to add to the numbers of such as can only see half of a truth at a time, and men of half truths are dangerous and disturbing elements anywhere.

A much better plan to my mind would be the revival of the old system of apprenticeship with its successive stages of apprentice, journeyman, and master, clearly defined and subject at each stage to state supervision and control by a body chosen (like the board of pharmacy, from the members of their association) from the master plumbers' association of the state.

It may be said that this plan is impracticable, and that trades-unions would cry out against it. Impracticable it certainly is not, and trades-unions should not object, because it would diminish the number engaged in the work by weeding out and driving away incapables. Such a system would elevate the tone and give the public confidence in your art. That such a system would reform everything from the outset of its adoption, it would be absurd to claim; but that the evils of the present system would rapidly and progressively diminish there is not the slightest shadow of a doubt. I have taken up this topic so intimately related to the progress of your art because it is one of peculiar interest to me as a sanitary officer from every conceivable standpoint. The regulation in some manner of the plumbers of Chicago by law is only a matter of time, and short at that. This regulation has already been completed in New York state, and the plumbers of New York city and Brooklyn have been placed, it must be confessed somewhat hastily, under the control of the city department of health. This procedure has been criticized, not entirely without reason, but with too much acerbity by many honest and undeniably able plumbers sincerely desirous of elevating the tone of their art, as not calculated to accomplish the object aimed at.

It seems to me that a movement which would anticipate all hasty legislation of the kind to which allusion has been made might, with great propriety, be inaugurated by this association. Your interests as individuals, as well as skilled mechanics, are deeply involved. Everything which enhances the prosperity of the communities in which you dwell and labor increases your prosperity. Legislation based upon the plan so briefly sketched would please every honest plumber, and gratify every student of state medicine. Your best interests and the interests of the sanitarian are so intimately interwoven that anything which tends to place them in antagonism is to be depreciated, and it cannot be denied that laws modeled on the New York plan do tend to create such feeling. In brief: Let the master plumbers' association of the state be incorporated by legislative act; let a board of five members of the association be appointed by

the governor to act as an examining and licensing body; let it be provided that any plumber convicted of violating statute or municipal law shall suffer revocation of license.

MR. GENUNG'S SUGGESTIONS.

The address not only commanded earnest attention but was heartily applauded. At its close, Mr. W. H. Genung, chief inspector of the health department, was called upon for a speech.

Mr. Genung said he hoped the time would soon come when the city ordinances would be so amended and improved that they would cease to be a stumbling block both to the health department and the plumbers. At present the commissioner of public works could not legally refuse a plumber's license to any applicant who had a dollar or two in his pocket and the names of two licensed plumbers signed to his application. There ought to be an examination of these applicants; the law should send them to an authorized committee of the master plumbers' association, who should pass upon their qualifications, and the recommendation for a license be subject to the approval of the health commissioner and commissioner of public works. A hindrance at present was the lack of authority by law to weed out incompetent and disreputable plumbers. But the association could do much in the way of notifying the health commissioner of bad work, and the latter could then prosecute, and persistent punishment by fines would do much good in the line of reform.

STATE ORGANIZATION.

Dr. DeWolf rose for a moment and again urged state incorporation of the association. It was necessary that every society should be the judge of its own members. If incorporated, one of the articles of incorporation being that the governor should appoint five members of the association as an examining board, whose recommendations should be basis for a license, every member of the profession who practiced it must come before the board, and it would be the fault of the association if incompetent and dishonest men secured the right to do plumbing in this state. He thought the commissioner of health and the commissioner of public works should be left alone to enforce the laws rather than pass upon the qualifications of applicants.

THE HEALTH COMMISSIONER ENDORSED.

In response to a call, Mr. J. J. Wade heartily endorsed what Dr. DeWolf had said, and thought that it betokened the beginning of a new era for the plumbing fraternity of this city. He held that Dr. DeWolf had proved himself to be a gentleman of scientific knowledge, of strong mind, and one who could not be swerved from duty. When Chicago was deep in mud and mire and her alleys were reeking with filth, when many of the dwellings of the rich and poor alike were full of disease and death Dr. DeWolf took charge of sanitary affairs. Notwithstanding the extraordinary growth of the city in population, its death-rate as a result of sanitary improvements, was less than that of any other city of its size on the globe. No contagious diseases now prevail, and the houses of all are visited by sanitary experts, whose duty it is to prosecute those who violate the sanitary laws. Through the exertions of the commissioner of health a state law has been established which requires proper plumbing, sewerage and ventilation. Mr. Wade believed that, in time, no man would be granted a license to do plumbing who had not first obtained a diploma, and he thought it was time to move in this matter. As the health commissioner needed "aid and comfort" in his work of proposed reforms, he would give the pledge of the association that 160 plumbers of Chicago would exert themselves in giving information of the violation of sanitary laws. The speaker would disabuse the minds of the public as to the alleged extortions of plumbers; no class of men, he said, worked harder for their daily bread; not one of them had laid up enough to keep his family a year without labor. The public should encourage them in an effort to keep unworthy men from doing plumbing.

ENTERTAINING INTERLUDE AND LUNCH.

A pleasant entertainment of music, recitations, ventriloquism, etc., followed, the leading participants being Messrs. W. W. Murray and George Percuse and Prof. DeLacey. This was followed by a bountiful lunch, and a dance consumed the remaining hours of the evening.

THE ATTENDANCE.

The attendance was large, among those present being Mr. E. W. Blatchford, of E. W. Blatchford & Co.; Mr. John Clifford, of the L. Wolff Manufacturing company; Mr. J. N. Raymond; Mr. England, of Peck Bros., of Hartford, Conn.; Mr. Hood, of Cooper, Jones & Cadbury, of Philadelphia; Mr. Fieldhouse, of Fieldhouse, Dutcher & Belden, of this city; Mr. W. H. Genung and the full force of inspectors of the health department, representatives of other departments of the city government and other gentlemen.

THE NEW JERSEY SANITARY ASSOCIATION.

The annual meeting of the above association was held at Trenton, N. J., in the earlier part of last month. The annual address of the president, Mr. J. C. Bayles, was upon the subject of popularizing sanitary information, in which he stated that while they seemed to be little encouragement to the sanitarian, upon analysis it would be found that there was substantial progress and that well-directed sanitary work would produce a favorable result. The public mind is naturally receptive of information touching health, as is evidenced by the quaint aphorisms and sayings bandied about among the general public, having their origin often in the advertisements of quack nostrums. The influence of health columns in the newspaper press was evident. The influence of associations like the one he addressed was also shown in the fact that by its papers and discussions, it directed local attention to the subjects treated. Dividing hygiene in two portions—that which concerns the man as an individual, and that which concerns him as a member of a community,—Mr. Bayles stated that in matters of personal hygiene, the physician was the only teacher which the non-reading portion of humanity would have. The dissemination of sanitary information concerning the public must be done on a larger scale than in the case of the individual or the family. The methods undertaken by the state board of health of Michigan to scatter health knowledge by means of its popular sanitary conventions, its annual reports, its weekly reports of sickness, etc., were described at length. He recommended for the New Jersey association two meetings each year, and changes in the constitution which would give a membership and a fixed revenue.

There were papers on methods of sewage disposal without discharge into streams, by J. J. R. Croes, C. E., of New York; on appliances for raising and distributing water by Prof. C. F. Brackett, of Princeton; on filtration, by Prof. Geo. H. Cook, of New Brunswick; on the Passaic River, by Prof. A. R. Leeds, of Hoboken; a very important paper on malaria, by Dr. T. N. Harvey, of Orange, (which will be published hereafter in The Sanitary News,) and on the germ theory, by Dr. E. L. Godfrey, of Camden. Dr. J. W. Pinkham, of Montclair, read a valuable paper on domestic wells and cisterns, in which he said the best way to build wells was one that will secure pure water with the least possible extraneous matter. Different methods are necessary, he said, for different localities. Ground water furnishes supply to springs and wells, the most sparkling and wholesome, when pure. If communication be once established between cesspool and well, it will steadily increase in volume. Cesspools should be remote and-water tight. The wells should be so deep that the source of water would be below the penetration of the surface water. The driven well is one of the best when it draws its water from an uncontaminated source. The old-fashioned wall well must go. Cisterns must be perfectly water-tight, with good filterers, and so constituted as to keep out dust and dirt.

Prof. H. B. Pierce, of New Brunswick, offered the following sets of resolutions, which were referred to appropriate committees with power to act immediately:

Resolved, That the state board of health be requested to have printed slips containing names of diseases, which are considered dangerous, distributed among the city and county superintendents of the schools; that physicians be requested to notify either the superintendent or principal whenever a dangerous contagious disease is found in a family, of whose members one or more attend a school; that when such notice is received the teacher be authorized to suspend all pupils from such family until the attending physician certifies that all danger from contagion has passed; that the state board of health be requested to obtain the passage of a law forbidding the holding of public funerals in all cases where death was caused by a contagious disease; also, when public notice of funerals is given such notice shall name the disease of the deceased

Resolved, That the school year begin on the Monday next to the fifteenth of September, and close on the last Friday in June; that the morning session commence at 9 o'clock, and close, for primary classes, at 11:15, and for all other classes, 11:30; that the afternoon session commence at 2 o'clock, and close, for primary classes, at 3:45, and for all others, at 4; that no general recess be given, but that individual recesses be granted whenever necessary; that calisthenics be required twice in the morning session, and once in the afternoon, allowing from three to five minutes for each exercise; and during such time the air of the room to be wholly changed; that the state board of education be requested to require all teachers, as one of the necessary qualifications, to obtain a certificate of a knowledge in the elementary principles of physiology and hygiene.

The officers elected for the following year were as follows: Presi-

dent, F. Gannett, Burlington ; recording secretary, Dr. D. C. English, New Brunswick ; corresponding secretary, Prof. J. M. Watson, Elizabeth ; treasurer, Dr. W. K. Newton, of Paterson.

SANITARY CONVENTION AT IONIA, MICHIGAN.

This convention, held at Ionia under the auspices of the state board of health, may be considered in point of attendance the most satisfactory of any of their long series of meetings. The convention met Thursday afternoon, Dec. 13, at the city hall, which was uncomfortably filled. After prayer and an address of welcome by the mayor, Rev. Dr. J. Pierson, president of the convention, delivered an excellent address on the relation of sanitary science to national wealth. It dealt logically with the somewhat mysterious values attached to health and life. Dr. John Avery, of Greenville, read a paper on contagious and infectious diseases, urging that diphtheria and scarlet fever, being fully as dangerous, be handled as vigorously as small-pox so far as preventive measures could go. This paper was warmly endorsed. Dr. Frederick Gundrum, of Ionia, in treating of the best method of disposing of the dead, said that, to his own mind, cremation offered the only safe method, but, from deference to public opinion, he treated of the safest conditions of inhumation, which were distance from any village or source of water-supply and a deep gravelly soil. At the evening session there were over four hundred people present, who manifested their approval by frequent applause. Mr. Lemuel Clute, of Ionia, denounced the use of tobacco, and supported his own views of its deleterious action on the human system by statements from the local medical men. This was discussed by Alexander Dodge, Dr. Thomas and Dr. Kellogg. The subject of ventilation was then treated by Dr. J. H. Kellogg, superintendent of the sanitarium at Battle Creek. The speaker, in a graphic manner, aided by a blackboard and several ingenious experiments, illustrated the effects of carbonic acid gas and the products of respiration on the human system. By a stereopticon, views showing proper methods of ventilation under a variety of circumstances, were thrown on the screen. The discussion was postponed until the following morning session, and was participated in by Dr. Thomas, who scouted the ideas advanced by Dr. Kellogg, saying they were extreme and calculated to alarm where no danger existed. He did not believe carbonic acid gas was poisonous to the system, but that if persons died when subjected to its inhalation it was because of the exclusion of atmospheric air, as occurred in drowning. This view was combatted by Dr. Jno. Avery and Dr. Henry B. Baker, the latter recalling an experiment by Prof. R. C. Kedzie, in which a bird was imprisoned under a bell-glass, the normal amount of oxygen being maintained, when, by the addition of an amount of carbonic acid gas, the bird was killed. Prof. F. S. Kedzie, of the agricultural college of Lansing, read a paper on chemistry in its relations to domestic life, which in its scientific, yet popular, explanations of the many phenomena of domestic life was very instructive. He illustrated the somewhat new test for glucose, by which it has been claimed that one part of glucose in a thousand of cane sugar could be detected,—namely, by adding a solution of picrate of potash, (made by adding picric acid to caustic potash and dissolving by the aid of heat,) to a solution suspected of containing glucose. If if be present the picrate solution will turn from orange to dark brown, or in presence of a large amount of glucose to black. In the absence of glucose no marked change in color occurs. His paper was enthusiastically received. Dr. Arthur Hazlewood, of Grand Rapids, read a paper giving hints on the care and preparation of food, including many excellent instructions on the selection of meats, and the hygienic cooking of different articles. Dr. S. V. Romig, health officer of Ionia, read a paper on the disposal of waste matter, which subject interests Ionians greatly at the present time, as they have no sewerage system and are about to introduce one.

Dr. O. R. Long, of Ionia, read a paper on the present and future water-supply of Ionia. The present supply is about eighty-three gallons a day per capita. With the present source, and at the estimated increase of population, the supply a decade hence will be forty-three gallons per capita. The subject of school hygiene was treated by Prof. T. P. Wilson, of the university of Michigan, at Ann Arbor. In the evening session Dr. Henry F. Lyster, of Detroit, read a paper on sewerage, which, with miscellaneous business, closed the convention.

In Rio de Janeiro, during the last half of October there were fifty-seven deaths from small-pox and three from yellow fever.

Small-pox is reported epidemic in the vicinity of Vandalia, Ill.

An effort is being made to establish a sanitary association in Ohio.

SEWAGE DISPOSAL—HEALTH BOARDS.

TO THE EDITOR OF THE SANITARY NEWS :—Permit me to say that, in your editorial in THE SANITARY NEWS, in the issue of December 1, 1883,—"The Hennepin Canal as an Open Sewer,"—you consider the question as to the disposal of sewage from the right stand-point, which is, that it should not be turned loose like a mad animal to destroy, but should be so controlled that "it shall not only be harmless but may be profitable." It is acknowledged by all sanitarians, but not fully acted upon, that it is a filthy and wasteful, and, in view of the present source of our water-supply, a dangerous mode of disposal of sewage to conduct it into a stream, near at hand and convenient though it may be. You adopt the correct view, and one that in the near future will be universally acted upon, that effete material should be incorporated with the earth, or, the portion not suitable for that purpose destroyed or changed by fire. In this connection, it is evident that, in the near future, no supply of potable water will be taken from any stream upon whose banks there exists a population, or into which there enters waste containing effete matter from persons or premises. This will exclude nearly all streams as sources of potable water-supply. Such views may, for the present, appear extreme, but it is truth and will prevail. When sewage is properly incorporated with the earth; and when dug wells and befouled streams, are abandoned as sources of potable water-supply, and the surface drainage, or storm water, is carried into the first underlying water having gravel beds (where no stream is convenient), and the sewage is incorporated with the earth, thus finding its "proper place," then the great principles upon which good sanitation is based will be conformed to, and in a great measure "filth" will have ceased to exist, for "filth" is "misplaced material."

I cannot close this letter without indorsing, in the main, your views as expressed in the same issue of the journal relative to the separate organization of health boards and boards of examiners for the proper "regulation of the practice of medicine." I have always contended that such boards should be separate. You say truly that "if the supervision of medical practice is to be among the duties of the board (of health) it will command all the time and energy of the board, and all other sanitary efforts will be crowded aside and neglected." I am fully aware that several state boards of health have the sets of duties assigned them, and that they have done a great and good work; but how much more might have been accomplished if the duties had been assigned to separate organizations is a pertinent question. Some important portions of the work have, without doubt, been neglected, and this by no fault of the board,—but because the work is too vast.

I trust you may be able to exert an influence in Ohio, Indiana and other states that are striving after this "good thing," so that the work shall take the right course from the start and the efforts shall be persistent.

Indianapolis, December 11, 1883. * * *

"OLD-TIME PLUMBING."

TO THE EDITOR OF THE SANITARY NEWS :—If your correspondent, "A Modern Plumber," had thought for a moment, or read the last words of my brief paper, he might have noticed I told my hearers to take my remarks in earnest or otherwise. He takes them in earnest. But really, there was not much chance for sewer-gas in those days ; the majority of houses were on stilts, as it were, and it was not considered essential to cement the pipes leading to the sewer, so that ventilation was partly accomplished in that way. Furnaces and rubber weather strips had not made their advent, and fresh air had a possible chance in most of the houses. I am glad, however, for the criticism and pleased to see that the plumber is alive. The remark, "Have we improved since then?" referred to people, not to plumbing. "A Modern Plumber" will find me as progressive as the most modern, and glad I am that we are progressing.

A. YOUNG.

Chicago, Dec, 18. 1883.

DEODORIZERS FOR EARTH CLOSETS.

TO THE EDITOR OF THE SANITARY NEWS :—Your correspondent in the issue for November 15, 1883, in his article on earth closets, speaks of coal ashes as the best material to use. While it answers the purpose, and is always at hand, it is in my opinion, not the best. Clay stands first on the list, loam next, and then ashes. There is one objection to the ashes, and that is the dust. Mixed with loam, however, this will be avoided, as it is not necessary that it should be absolutely dry.

Chicago, Ill. L. P. HASKELL.

CURRENT PUBLICATIONS.

BUILDING SUPERINTENDENCE.

Fortunate, indeed, is the young architect who can glean from the pages of Mr. T. M. Clark's book bearing the above title, so much valuable knowledge concerning the practical erection of buildings, without undergoing in actual experience so many of the petty trials and tribulations connected with superintending such undertakings. Mr. Clark has divided his book into three parts, in which he gives the duties of the superintending architect connected with the erection of a stone church, a brick dwelling and a frame dwelling, respectively, from the breaking of the ground to the completion of the building. This work he has done well, and his book can be profitably studied, not only by the architect and builder, but by the owner of proposed buildings as well. It is from the press of James R. Osgood & Company, of Boston.

HEALTH IN THE HOUSEHOLD; OR HYGIENIC COOKERY.

Dr. Susanna W. Dodds, the author and compiler of the above book, is evidently a cook as well as a physician. If there is any profession which should have an intimate knowledge of cooking it is that of medicine. Dr. Dodds has uttered her ideas in the form of an attractive book containing "the reason why" a scientific hygenic dietary is needed, the "hygienic dietary" containing plenty of hygienic recipes, and then as a "compromise" to the general public who will not eat grains and fruits exclusively she has added a large number of recipes of every kind. The book is sold by Jansen, McClurg & Co., corner Wabash avenue and State street, Chicago.

HEALTH NOTES FOR STUDENTS.

This little vest pocket manual by Prof. Wilder, of Cornell university, aims to place in the hands of the student plain rules, by observing which he may place himself in the way of maintaining health when he most needs it,—during his student life.

THE NORTH AMERICAN REVIEW.

The January number of this splendid publication will present among other papers one on the question of ecclesiastical control in Utah by President John Taylor, the head of the Mormon church, and Hon. E. H. Murray, governor of the territory. Gail Hamilton will complete her caustic criticism on the domestic traits of Thomas Carlyle. The evils incident to immigration will be set forth in a paper by Edward Self.

PUBLICATIONS RECEIVED.

"Hospitals for Contagious Diseases, and their Proper Location." By R. J. Farquharson, A. M., M. D., Secretary Iowa State Board of Health. Pam. pp. 12.

"Australian Health Society." Seventh Annual Report read at the General Meeting of the Society held at the Town Hall, Melbourne, on 27th September, 1882. Pam. pp. 16.

"The Emunctories." By the Rev. Dr. Bromby. A Lecture delivered for the Australian Health Society, 18th September, 1882. Pam. pp. 16.

"Kitchen Physic." By Mrs. Bartrop and Miss A. C. Moore. Pam. pp. 8.

"Little Stomachs." Written for the Australian Health Society, by Alex. Sutherland, Esq., M. A. Pam. pp. 8.

Our Eyes and Our Industries." By B. Joy Jeffries, A. M., M. D. Reprint from the 4th Annual Report of the State Board of Health, Lunacy and Charity of Mass. Pam. pp. 32.

"Reports from the Consuls of the United States on the Commerce, Manufactures, etc., of their Consular Districts." No. 32. August, 1883. Pam. pp 414+vi.

"Report of the Commissioner of Education of the United States." 1881.

"Influence of Medical Men." By Nathan Allen, M. D., LL. D. Read before the American Academy of Medicine at its annual meeting in Philadelphia, Oct. 26, 1882. Pam. pp. 5.

"A Guide to the Micrsocopical Examination of Drinking Water with an Appendix on the Microscopical Examination of Air." By J. D. Macdonald, M. D., R. N., F. R. S., with twenty-five Lithographic Plates. Second Edition. Philadelphia: P. Blakiston, Son and Co. 1883. Pp. 83.

"Health Notes for Students." By Burt G. Wilder, M D., Professor of Physiology in Cornell University and in the Medical School of Maine. New York: G P. Putnam's Sons. 1883. Chicago: Jansen, McClurg & Co. pp. 58. 20 cents.

"Horses: Their Feed and their Feet. A manual of Horse Hygiene." By C. E. Page, M. D. New York; Fowler & Wells, pp. 149. Chicago; Jansen, McClurg & Co. 50 cents.

"Health in the Household; or Hygienic Cookery." By Susanna W. Dodds, M. D. New York: Fowler & Wells. Chicago: Jansen, McClurg, and Co. pp. 590. $2.00.

"Fourth Annual Report of the State Board of Health of South Carolina for the fiscal year ending October 31, 1883. Columbia, S. C. Chas. A. Calvo, Jr. State Printer, 1883." Pp. 175.

A case of small-pox among the servants of Gen. W. T. Sherman, in St. Louis, caused a postponement of a reception.

The Indianapolis board of health has closed a school-house until it shall have been put in a healthful condition.

NOTES AND NEWS.

ANNOUNCEMENTS.

Jan. 1. 1884. At Nashville, Tenn. Regular meeting of the State Board of Health.

Jan. 1. At Concord, N. H. Meeting of the State Board of Health.

Jan. 8. Lansing, Mich. Regular meeting of the State Board of Health.

Jan. 8, 9 and 10, at Columbus, Ohio. Annual meeting of Society of Engineers and Surveyors.

STREETS, PAVEMENTS, ETC.

After the completion of $150,000 worth of paving, the contract of which is to be let, Dallas, Texas, will have expended $225,000 for that purpose.

A gas well is discovered at Seymour, Ill.

SEWERAGE.

The trunk sewer of Buffalo now being constructed is eight feet in diameter, and 22,366 feet long. It is lined throughout with twelve inches of brickwork in three four-inch rings.

Waring's system of sewerage is being urged on Kansas City by Octave Chanute, C. E., while City Engineer Knight opposes it.

An inspector of plumbing has been appointed in Baltimore.

The San Francisco papers urge the universal laying of stone pavements as a cure for the sand-choked sewers.

The sewer committee of Dayton, O., recommend, as a step toward a sewer system for that city, that a complete topographical survey be made.

A contract for a redwood sewer in Twenty-fifth street, in San Francisco, was awarded to M. Miles & Co., at $1,344.10.

WATER-SUPPLY.

Brooklyn, N. Y., may secure an additional daily water-supply of 40,000,000 gallons by extending a conduit beyond Rockville Center.

An artesian well sunk by the proprietors of the Julian hotel, Dubuque, Iowa, is 880 feet deep and yields 400 gallons per minute, with a pressure of forty-five pounds to the square inch.

BUILDING ITEMS.

Farr and Vincent, of Grand Rapids, Mich., have been awarded the contract for the north wing of the main building of the Michigan reform school, at Lansing.

Fuller and Warren supply their Ruby furnaces to the new schoolhouse at Lansing, Mich.

In a new Chicago building, hollow cast-iron columns are used to support the several iron-girders carrying the floors. The columns were cast hollow by means of a core in two pieces, which was taken out after casting. Accidentally, one of these columns was found to contain water. How it came within the column is somewhat of a mystery, as the tops of the columns are entirely covered by the girders and pintles supporting the column above. A column was purposely tapped about eighteen inches from the floor, but no moisture was found. A second tap was made at a hight of seven feet, and six gallons of water drawn off. There was not much rain during construction. Mr. Hague, a mining engineer, suggests that the water collected by condensation, and was supported by the web of iron which might form between the ends of the two cores. As to the web he is probably correct, but as to why there should be water by condensation in the upper compartment, and none by the same cause in the lower compartment is not clear.

PERSONALS.

Dr. John Favill of Madison, Wis., died at his residence in that city on the 9th of December of paralysis. Dr. Favill was about 64 years of age. He had been prominently identified with the medical profession of his state for more than thirty years, having been one of the oldest and most valued members of its state medical society of which, at one time, he was president. He was also one of the original members of the Wisconsin state board of health, serving as such for a period of six years, with great acceptance. Dr. Favill was a man capable of filling almost any position but chose rather the quiet dutics of his profession to which he was entirely devoted.

Dr. Hosmer A. Johnson, of Chicago, has signified his intention to resign from the national board of health.

The Ohio society of surveyors and civil engineers meet this month.

The next meeting of the sanitary congress of Great Britain will be held at Dublin beginning Oct 14, 1884

CURRENT TOPICS.

SOME time since THE SANITARY NEWS criticized the action of the health authorities for allowing Egyptian rags to be imported without other disinfection than that received in the chemical vats of the paper mills. The surgeon general of the marine hospital service has requested the state department to inaugurate the disinfection of such rags before shipment to this country.

AN international health exhibition will be held in the exposition building at South Kensington, London, England, in 1884. The exhibition will endeavor to illustrate the effects which food, dress, the dwelling, the school, and the workshop have upon health. There will be a division on health and one on education, the division on health being divided into groups on food and drink, dress, dwellings, schools, and workshops and factories. Mr. E. Cunliffe Owen is the secretary.

THE second annual report of the Indiana state board of health, just submitted to the governor, estimates that, were the returns of deaths complete, the deaths would be about sixteen in one thousand population. Of diphtheria reported, three hundred and nine cases out of seven hundred and twenty-seven were fatal. The sanitary condition of ten thousand school buildings is reported to be bad; twenty per cent. of them have no water-closets, and of the remainder forty per cent. are in bad condition; seventy per cent. have no vaults, and eighty-five per cent. have never been cleaned or disinfected.

CONCERNING the liability of landlords and tenants to abate nuisances, Judge Armstrong, of the superior court of Sacramento, has given a ruling which possesses interest for health officers as well as for members of the bar. Judge Armstrong holds that agents are liable to the same extent as landlords, when they have full discretionary powers. If a landlord lets his premises, free from a nuisance, and the tenant causes a nuisance, when he could as easily occupy the premises so as not to do so, the landlord is not responsible. Nor can the landlord, after leasing his premises, enter them to abate a nuisance more than could a stranger. If the nuisance exists when the premises are leased, or the purpose for which they are leased would cause a nuisance, and he so uses the premises and the nuisance is maintained, the court holds both tenant and landlord to be liable. If the tenant creates the nuisance during the period of rental, for which the landlord can not be held liable, and the landlord renews the lease with a knowledge of the existing nuisance, or grants a new lease to a new tenant, the nuisance being unabated, the landlord is to be held liable. As rentals by the month are monthly renewals, the landlord can be held liable in a great majority of cases. The court, in closing, says that the tenant in possession of premises is always liable for a nuisance thereon. To hold the landlord, it must be shown that the premises were foul when he let them, or that he renewed the lease while they were foul, or that he created the nuisance himself, or that he retained the general control over the premises. The right to enter to make repairs is the criterion by which the liability of the landlord is to be determined.

A ST. LOUIS paper has attacked the master plumbers' association of that city unkindly and unwarrantably. It is charitable to believe that the attack grew out of an ignorance or misconception of the aims of the association. It does not seem possible that any journal, having a knowledge of the objects which a master plumbers' association strives to attain, could class it with the ordinary trades-unions, many of which have a tendency to demoralize labor. The master plumbers, however, in banding themselves together in local, state, and national associations, do not do so to force concessions to terms distasteful to their patrons. It is a union such as is seldom seen in any branch of industry; one intended (and actually carrying out its intention) to advance the intelligence of the members, and, consequently, their capacity to do better and safer work. In the construction of a building requiring the services of a plumber, in a city where there is an association, THE SANITARY NEWS would advise that the work be given to a member of the association, rather than to one not a member, for the reason that the member, if he is a conscientious member, has all the advantages of the discussions and papers upon plumbing work, which are had in his association meetings.

THE far-famed upas tree, which has been fruitful as a figurative expression to hygienic lecturers as well as ministers, has now passed its usefulness for that particular purpose. Java is the home of the upas tree and a scientific investigation reveals the fact that the deadly condition of the atmosphere in the valleys where the upas tree grows, is not caused by exhalations from the tree, but, at intervals, sulphurous vapors from underground volcanoes escape through cracks in the earth and render the air irrespirable. At times, the air is perfectly pure.

LE societé d'hygiene du province de Quebec is the name of a society of French Canadian physicians. Dr. Tafard, of Montreal, is president.

THE city of Batavia, Java, is a typical, unhealthy city. Originally built on a low and marshy site, the accumulations of two hundred thousand people have rendered the soil more dangerous than before. The city is penetrated by canals in all directions which are used as mercantile traffic-ways and as sewers. The cause of malaria is there so prevalent that, in the more unhealthy months, no one remains in the city over night, but all repair to the highlands just back of the city. Sailors are not allowed to remain on land over night.

UNDER the recent sanitary legislation in the province of Manitoba, there are twenty-two health officers of counties to be appointed January 22, 1884.

J. B. GRINNELL, secretary of the committee appointed by the recent convention of cattle-raisers, with a view to securing adequate national legislation to prevent the spread of contagious diseases among cattle, has issued a circular which states pertinent facts concerning the importance of the cattle interests of this country. He shows that, owing to the restrictive regulations on the part of foreign governments because of the presence of communicable diseases among our live-stock, the falling off in our exports during

1881 and 1882 was $25,000,000 for each year. There will be another convention in Washington during the present session of Congress.

The Maryland state board of health proposes to ask the state legislature to place the various public institutions under the sanitary supervision of the local board of health of the district in which they may be located. There are several things which might be said in favor of such a system. If jails and poor-houses are to be classed among public institutions, however, there will be a poor chance for their sanitary condition to be much improved. The local board of health will not usually take action which will result in an increase of taxes. In a large city, like Baltimore, for instance, where there may be several state institutions, it is probable that the efficient health service the city already has would improve the sanitary condition of them, had it a legal right to do so. In the case of hospitals, it is for the interest of the locality to have sanitary control, that contagious diseases might not be spread from them. There are many arguments in favor of the proposed amendment to the law.

From advance sheets of the report of the sanitary committee of the board of education of the city of Chicago for the last fiscal year, The Sanitary News learns with pleasure that the board is fully alive to the necessity for healthful conditions in the schools, and is doing all it can with the means at its command to improve them, making new buildings as good as existing knowledge and the circumstances will permit. In the words of one of the most active sanitarians of Chicago, "the board of education cannot appropriate too much money for the health of the pupils." At the same time, boards are often blamed for the existence of conditions which they would willingly alter had they the money necessary for such action. It must be remembered that the city cannot construct buildings fast enough to accommodate the increase of the school population. During the year there were 12,919 children who were deprived of their full school privileges, their attendance being limited to one-half day because of the lack of seating capacity, one-half of that number attending during the morning session and the other half in the afternoon. Besides these, there were 2,480 children whose applications for admission were refused for lack of room.

There were eleven new buildings begun and in process of construction during the year, having a seating capacity of 9,350. Four of these are heated by Ruttan furnaces and one by steam. The lighting of the schoolrooms has received especial attention. Of this the chairman of the committee on sanitary affairs, Dr. Norman Bridge, says: "Into each inside room — which can receive light from but one side — one additional window has been introduced, so that there are five instead of four, as in the old buildings. In the best of the old buildings the glass-lighting surface of the windows in the inside rooms was only 10.71 per cent. of the floor space; in the new buildings the additional window will increase the lighting surface to 13.39 per cent of the floor space. Thus, for these rooms, the light is increased 25 per cent, which is altogether too little. The amount of lighting surface for a schoolroom the size of these (28x34 feet approximately), and which can receive light from one side only, occupied by upward of sixty pupils seated, should not be less than 16 per cent of the floor space. Hence, we require an additional window for such rooms before we reach the minimum of what is essential for the welfare of the eyesight of our pupils. The corner rooms of these buildings are provided with six windows each, as in the best old buildings. This gives a lighting surface of about 16 per cent of the floor space. The old plan was to place three windows on each of the two exposed sides, so that an equal volume of light would be received from the left and behind the pupils. In the new buildings the windows at the left of the pupils have been increased to four, and those at the back reduced to two—one of the latter being placed at the right-hand corner, the other at the left-hand corner of the room. This arrangement admits more light where it is wanted, from the left, and less where it is not wanted, from the back of the pupil. It would be a further improvement to take out the rear window near the corner of the building (rear right-hand corner, looking from the teacher's platform) and put it in the side of the room to the left of the pupils, to increase the light where it is required, and remove it from where it is harmful rather than otherwise. The other rear window, that in the left-hand corner, is useful because it throws light down the side of the room farthest from the side windows—a zone that in a dark day needs more light than can be supplied by four or even five side windows."

The crowding of the schools results in the necessity for using basement rooms for school purposes, which are badly heated, ventilated and lighted. The ventilation of many of the old schools has been improved during the year. There is still room for further improvement, however, as there are the Division and Cleaver streets, Foster, Pickard, Sheldon, King, Headley, Scammon, Ward, and Wentworth avenue schools, in which the ventilation is notoriously bad. The board has done much good work. If it will follow the suggestion of Dr. Bridge, it will do much to improve the health of the children committed for a large portion of their younger days to their charge.

Recognizing the importance of the museum of hygiene at Washington, under the charge of the navy department, The Sanitary News is glad to add its commendation to the following, which was adopted at the meeting of the association in Detroit: "The American public health association congratulates the surgeon-general of the navy, Dr. Philip S. Wales, on the admirable and valuable museum of hygiene which he has succeeded in establishing in the city of Washington in connection with the bureau of medicine and surgery of the navy department, and expresses its appreciation of the zeal and professional interest which he has exhibited in the cause of sanitary science." The committee on the museum of hygiene was directed to communicate to the secretary of the navy and the president of the United States the hope of the association that the valuable work so auspiciously begun, might be facilitated by their favorable consideration.

THE committee of the Indiana state medical society on state medicine, through its chairman, Dr. Thaddeus M. Stevens, of Indianapolis, has issued a circular to the members of the society, upon the replies to which he wishes to base his report to the society. The committee has framed a series of questions designed to add to the existing knowledge concerning the causation of typhoid, typho-malarial, and continued fevers. There are questions concerning vaccination, health boards, and state hospitals. One object of the committee is to determine whether typhoid fever ever originates from other causes than a previous case. They wish to learn whether filth causes the disease or acts as a harbor for the germs from some previous case.

IN his annual report for 1883, as chief of the bureau of tenement and factory inspection of Chicago, Mr. W. H. Genung, reported 3,744 examinations of tenement houses containing 42,331 persons. From his experience he recommends an annual house-to-house inspection of all tenements during the months of April, May, and June, in order, as he says, "that the neglected repairs and accumulations of the winter months may be rapidly and effectually made or remedied, and a considerable cause for sickness and possible death done away with." This is a valuable suggestion, and it is hoped that when the municipal year draws to a close, and the new year begins, there will be no derangement of the plans of the health department by reason of a lack of inspectors to do the work.

THE permits issued for buildings for habitation during the year, by the health department, amounted to 2,444. These were intended for housing 4,551 families, or an estimated population of 18,204. Of the permits issued, 1,162 were for flats, or houses intended for one family only on one floor. Chief Inspector Genung recommends, as the rent of these flats is far beyond the ability of the laboring-man and clerk to pay, that buildings four or more stories in hight be erected on cross-streets near the centers of business, and leased on reasonable terms to such persons.

THE health department during the year abated 13,591 nuisances, made 584 sewer connections, condemned 186,879 pounds of meat, brought three hundred and eight suits for violation of health ordinances, and had one hundred and fifteen cases of small-pox. The death-rate for the year was 20.6 per one thousand, or three per one thousand less than in 1882.

THE interest shown in the late meeting of the master plumbers' association, at which an address was delivered by Dr. Oscar C. De Wolf, health commissioner, has prompted the association to arrange for a public meeting in a larger hall at some date in the near future. It is proposed to invite the public to attend with a view to exciting that general interest in sanitary matters which is already felt by so many. The master plumbers' association of Chicago has taken the right course in its efforts to induce householders to give attention to this most important of all subjects, sanitation. Whether they so understand it or not, the plumbers are thus benefitting themselves very much more than they would if they undertook to establish a mere union, in which the leading principle should be supposed self-protection in the matter of prices and the control of the trade. Another view of the matter is that the plumbers are thus elevating their trade in the eyes of the public. As Mr. Hamblin suggested in the paper read by him at the last meeting of the association, it has become, now, almost a necessity for the master plumber to understand the scientific principles of plumbing—mere mechanical knowledge does not suffice; while tending to interest the public in their business, open meetings, addressed by educated and prominent men, also stimulate the plumbers themselves to self-improvement. At the coming meeting it is proposed to have another address from Dr. De Wolf, as well as from others, and leading citizens and city officials will be invited to attend.

As showing how poorly educated some teachers of sanitary doctrines are, the heading to a short article on the disposal of sewage in an eastern trade paper, is headed "a new sanitary system." It is the same old and contracted idea that THE SANITARY NEWS has been battling against so long. The members of one trade or profession insist on thinking their work is the only valuable portion of sanitation. The disposal of sewage is only one of a great many important subjects which the sanitarian has to consider.

IN connection with the permanent exhibit and exchange of building materials and appliances, which will be opened in this city by Mr. Henry L. Gay on February 1, a movement has been inaugurated to establish a builders' and traders' exchange. This will be an organization of the members of all the trades and professions which have anything to do with the construction of a building. It is expected that the headquarters will be the building selected by Mr. Gay for the exhibit, and the rooms will always be open for the transaction of business. Usually in the lead, Chicago is behind in this particular undertaking, but it is confidently expected that she will soon come to the front. New York, Boston and St. Louis have large and important exchanges, while Cincinnati has the largest of all. Its association was organized in 1878, with twenty-four charter members, but has, now, more than two thousand three hundred. It is anticipated that this city can secure at least three thousand members within two years. At a preliminary meeting held on January 9, at which the attendance was unexpectedly large, a committee was appointed to arrange a form of organization, the architects, plumbers, masons, lumber-dealers, carpenters, stone-cutters, plasterers and ornamental iron-work being represented on the committee.

NO argument need to be advanced that this is a most important undertaking, and sanitarians should be especially interested in it. THE SANITARY NEWS has found it necessary, more than once, to condemn the practice of entrusting the construction of one's house to a contractor. "Build me a house and I will pay you for it," is too often the only order given by a person who is building. The explanation of this is not always found in indifference, but ignorance. Few know what details they want in planning, construction and materials, and have no idea that it is possible for them to learn. A builders' and traders' exchange aims to do more than benefit its members; and in connection with the exhibit of materials and appliances used in building, it will do very much toward helping the customers of the members to learn what is best to use.

CHICAGO SEWERAGE—MAN-HOLE COVERS AND SEWER VENTILATION—XVIII.

Wooden man-hole covers were in general use prior to the year 1879. For the eighteen years preceding that date the average cost of maintaining these covers was 38 cents each. In his annual report for the year 1878, Benezette Williams, principal assistant engineer, urged the adoption and use of iron covers. A standing objection to any municipal improvement then, as well as at the present time, was the cost. Mr. Williams sought to show that it would be economical to use iron covers rather than wood, and presented the fact that the cost of each wooden cover—38 cents—was equal to the interest on $5.40 at 7 per cent per annum, hence that, if $5.40 were added to the cost of wooden covers, a permanent cover needing no repairs, or renewals, could have been obtained and would have been equally economical. Wooden covers were then costing a little more than $5; if permanent covers could be obtained at any price less than $10.40 it would be wise to adopt them, "to say nothing of the greater satisfaction and safety attending their use." But covers of a good quality of cast-iron could be had at a cost not exceeding $10.

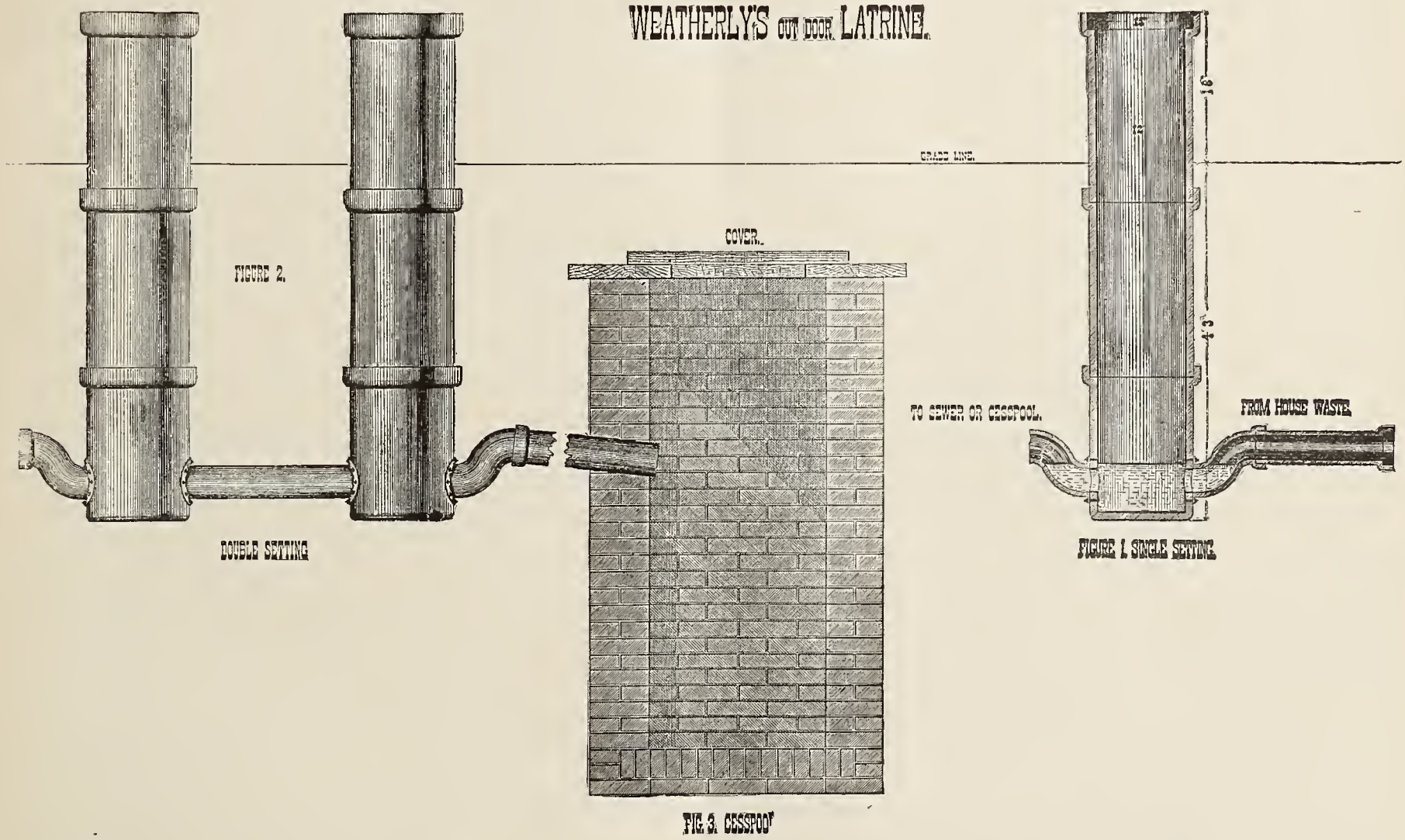
In accordance with Mr. Williams' recommendation the use of iron covers was inaugurated in the following year and 998 were substituted for wooden covers, at an expense of $7,332.46,—not including 1,136 open iron covers on man-holes and catch-basins for ventilating purposes, costing $3,568.71. The question of ventilating the sewers through grated man-hole covers was first suggested by Mr. Williams, and a small appropriation was made by the city council in the year 1878 for this purpose; nothing was done, however, until the following year. Two illustrations of the perforated cover of a street catch-basin were given in the last issue of The Sanitary News; the construction of those in use over man-holes is similar. The argument advanced by Mr. Williams for the use of the perforated covers was that "the general application of street ventilation will unquestionably greatly reduce the amount of sewer-gas which gains entrance to our dwellings, and thereby prevent much of the actual evil which now results therefrom, and in a measure tend to allay the uneasiness felt by the public in regard to the subject;" and he referred to certain European cities where ventilation is secured through the catch-basins, and without alleged objection.

The change thus begun of substituting iron covers for wooden ones, has been continued from year to year, until the present time, though without regularity. It is not possible to say, with any degree of accuracy, what proportion of the man-hole covers are perforated, though it is certain that the ventilation of the sewers by this method is not general. In the year 1880, no less than twelve thousand wooden covers were in use. The idea was conceived, that year, by the superintendent of sewers, of perforating these covers, in view of the fact that the day seemed far distant when open iron covers could be generally substituted. Accordingly, he had five two-and-one-half-inch holes bored in all new wooden covers and in all old ones which needed repairs This practice has not been universal, although more than twelve hundred of these perforated oaken lids were quietly put in place during the year named—quietly, because the people were not disposed to favor the idea of having sewer-gas set free in the streets so liberally. At the end of the year, the superintended reported favorably on the experiment, as complaints of the presence of sewer-gas in the interior of houses were rapidly decreasing. The "experiment" can hardly be considered successful. The situation is this: Certain streets, or certain parts of streets, are quite well provided with open man-hole, or catch-basin, covers; the gases generated in the sewers escapes too freely through these, thus causing a serious, if not dangerous, nuisance to those living in their immediate vicinity. Complaints have occasionally led to the closing of these open covers. There is no doubt that it would be desirable to have a thorough ventilation of the sewers at the surface of the streets, rather than to confine the gases, with the present ill-constructed and defective house drainage. The gases generally in a sewer are, probably, not seriously harmful unless confined; once in contact and commingled with the oxygen of the air their power for evil seems to be destroyed, unless, perchance, they convey the "germs" of some contagious disease. Indeed, it is much to be preferred that these so-called "germs" should be let loose in the unconfined and pure air of the street than that they should be led, or forced, into houses through inefficient traps and defective joints. But this ventilation must be general, as Mr. Cheney, the present superintendent of the sewer department insists, to give entire satisfaction. People are governed by prejudices, largely, and the rule applies in this as in other matters. The fear of sewer-gas escaping from a ventilated sewer through a man-hole or catch-basin cover is usually groundless, but it has led to amusing circumstances. Recently, the sewer department was implored by a citizen on one of the avenues, who had seen a perforated cover take the place of a tight one on a catch-basin, to have the old cover replaced, as the odor which escaped and invaded even his house at all hours of the day and night was absolutely unendurable; he was also in great fear lest the health of his household should be impaired. Mr. Cheney readily assented; no further complaint has been heard, notwithstanding the fact that the perforated cover was again substituted within a week,—quietly, of course, and without the knowledge of the offended householder. This circumstance has been repeated over and over again, always with the same result. Discretion is used by the department in this matter, and as little cause for complaint given as possible; but it would surprise most of the residents of Chicago if they knew to what extent the sewers of the city are breathing their gaseous emanations directly into the streets; and it would also be a reason for gratitude on their part if they also understood how the sewer department had thus defended them against invasions of pent-up sewer-gas directly into their houses.

It was thought, at first, that a considerable amount of dirt would work through the openings in the iron covers; hence a means of ventilation through the catch-basins was suggested. It was proposed to have a socket moulded on the upper angle of the trap, toward the basin, and a second connection made with the basin by means of a curved piece of six-inch pipe, above the water-line. This has been largely done, usually, with satisfactory results. As to the sifting of dirt through the open covers, no serious difficulty has been encountered.

AN OUT-DOOR LATRINE.

The horrors of the ancient and ever-present privy have been oft and again depicted, both as regards the shock to the sensitive and modest nature, as well as the danger to the health of the user from irregularity of habits caused by aversion, etc. At the same time, from a combination of circumstances, the offensive privy has to be constructed, as it often seems to be the only arrangement which will answer the purpose. The householder in the outskirts of a growing city frequently has a sewer built past his lot long before the public water-supply is extended to him. The board of health then condemns his privy as a nuisance dangerous to the public health (as it unquestionably is) and orders its abatement. The householder appeals to the plumber with the question as to what he can do under the circumstances. How can he connect with the sewer satisfactorily without any permanent water-supply? It is to aid the plumber in solving this problem that THE SANITARY NEWS has secured the permission of Mr. Warren C. Weatherly, of the firm of Shiriver, Weatherly and Company, plumbers, Grand Rapids, Michigan, to publish an illustration of an out-door latrine, designed by him to replace the ordinary outside privy and vault. It consists of a cast-iron receiver with trapped inlet and outlet connections. The inlet connection may end in outside slop-sink, which will receive all the waste water from the house, such as wash-water, dish-water, etc. It may also receive a spare rain-water leader, or overflow from the cistern, in which case it must be thoroughly trapped. The discharge pipe in cities runs to the sewer. The cast-iron receiver is properly cast to receive two lengths of twelve-inch vitrified tile, the top of which comes just under the seat of the closet, making a depth of about six feet from the seat-line. The inlets and outlets are fitted for four-inch pipe. The joints are cemented. The pipe is large enough to prevent soiling with excreta, which falls directly into the water in the receiver, where it remains for a longer or shorter time, according to the amount of waste water in the house. As it dissolves soon, and the quantity is so small, the odor is scarcely noticeable. For hotels, schools, boarding-houses, etc., a double setting may be made, as shown in the illustration. In country towns, where there is no sewerage system, the discharge pipe may enter into a water-tight and ventilated cesspool, which may be cleaned as often as desirable, and will not pollute the soil. There is no patent on the construction, and any one can use it. It is inexpensive, and seems to be a safe substitute for the dangerous and vile privy so commonly used.



DISEASES OF ANIMALS.

By a letter from Dr. H. J. Detmers, published last month, it will be seen that the French demagogue, Bert, is too sweeping in his assertions concerning the disease-infected American hog. Bert is reported as quoting Dr. Detmers, to the effect that diseased hogs passed his house in Chicago daily, and they were sold cheap and shipped to Bordeaux and Havre, France. Dr. Detmers distinctly denies having made such statements, and adds most positively that, during the last four months, he has examined four thousand hogs, and has seen at least ten times that number in one of the most prominent packing-houses in Chicago, and has not seen the slightest trace of disease. The disease known as hog-cholera is not as prevalent as in former seasons. The statement of Dr. Detmers concerning the prevalence of disease in swine is very important.

THE SEWERAGE OF NAHANT—II.

BY E. W. BOWDITCH, C. E.

When it is desired to flush any line of pipe, a sand bag is used as a plug for the outlet of a manhole, which is then filled with salt water by the town water-cart,—rather a primitive fashion of procedure, but one that it was decided to adopt, temporarily, during the first season, or until it should be demonstrated by actual experiment where flush tanks should be located and what their size should be. As a rule, water enough is put into the manhole in question to make a solid water plug, as it were, for forty feet of the sewer, below the manhole.

The flushing by this crude method has been so successful, and has to be attended to so seldom, that it is quite possible the special flush tanks may be omitted entirely.

During construction, silt, in the form of fine sand and clay, found its way into some of the pipes, and upon completion of the work deposits were found in certain sections; in one case to a depth of over three inches, and very compact. The question of removal seemed quite a serious one; the more so, after repeated flushings had failed to carry off the obstruction.

After repeated experiment one of the two following courses was adopted in every case: a shingle with a lighted candle fastened upon it was allowed to float down the pipe from a manhole, being controlled from the initial point by a string, so that it could be stopped when desired. An obstruction met could be located by measuring the length of the string. This being ascertained, a hoe or rake was introduced on one end of a series of jointed rods (which when screwed together somewhat resemble a fishing pole), and the sand loosened and afterwards flushed off with water; or, a stout twine was attached to a wooden plug, which was floated down from one manhole to another, and to which, in turn, was fastened a small rope and a section of rather heavy iron chain, which latter could be dragged to and fro, until the whole mass of sediment was loosened.

These appliances, except the shingle and candle, are the ones ordinarily in use for pipe sewers, and were found tolerably satisfactory, though not wholly so. To meet the want still felt circular brushes of various sizes that could be attached to a rope or a rod and then pulled or pushed through were devised; at first, these were made of stiff bristles, but now are constructed of flat steel wires, fastened to a wooden core, and with the arrangements before mentioned appear to be sufficient for all purposes. After being once thoroughly cleaned, the question of keeping the sewers in that condition was much simplified.

Inspection now consists either in reflecting the sunlight through the sewer, from one manhole to another (see Fig. 7), which enables a very fair inspection without any flush whatever, or in the use of the shingle and candle before mentioned. If any foreign matter appears to be in the pipe, its position can be located (if the day be sunny) by counting the joints in the pipe, which can be seen by the mirrors above referred to, and the brush, chain, hoe or rake used, as may seem best.

The system, which is to-day nearly five miles in length, is intended to be thoroughly ventilated, and includes not only the public sewers, but all private drains below running traps.

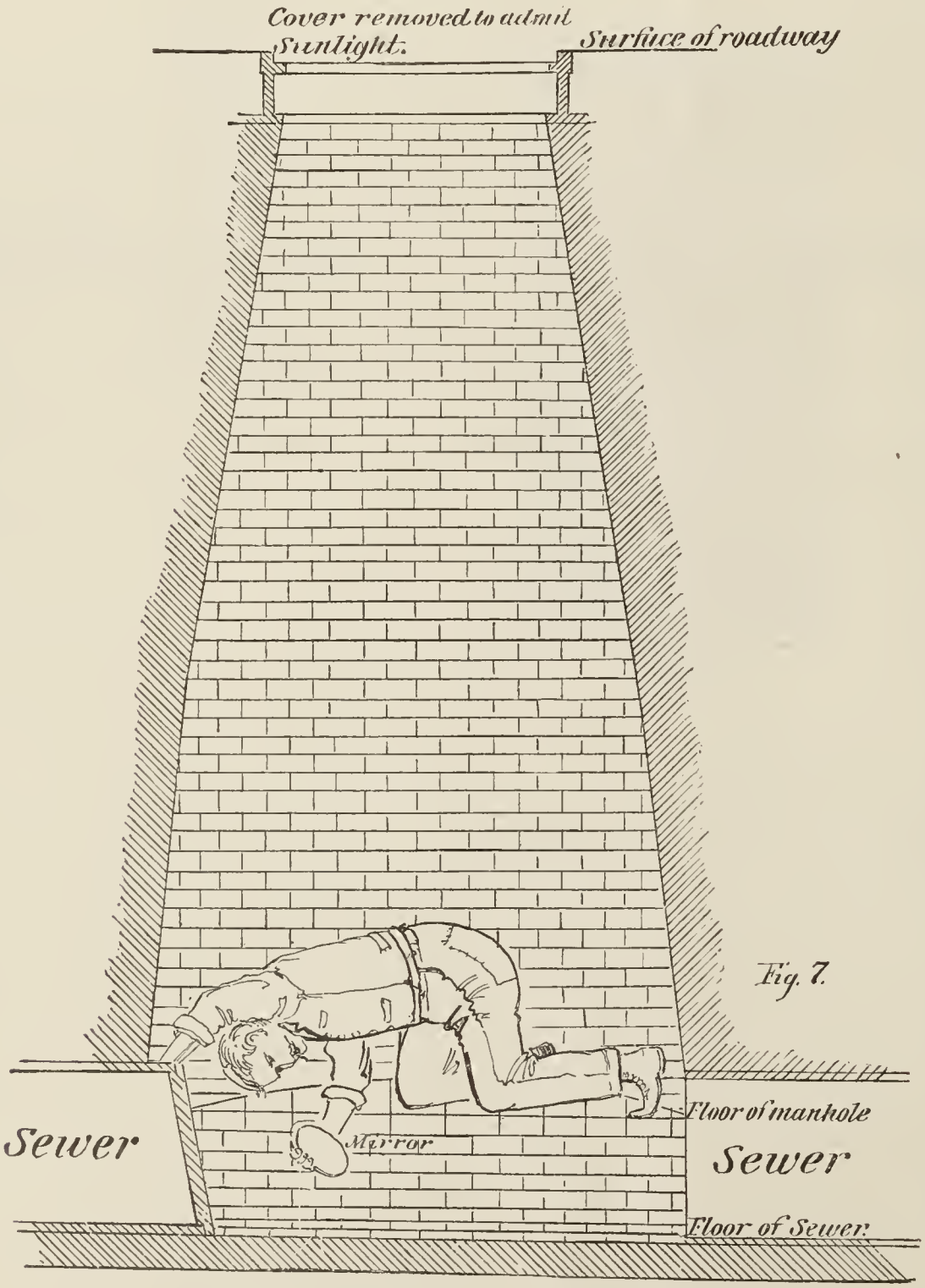


Fig. 7.

Section of Manhole—Showing Method of Inspection with Mirror.

The lower manhole on each trunk sewer is provided with a perforated cover, to relieve the other portions of the sewer from the pressure caused by heavy surf, and not, as has been suggested, as a fresh-air inlet, for, on the upper side of each manhole, is a flap valve or tide gate which would effectually prevent any such use being made of the perforated cover. The sewers and house connections above the last manhole on each trunk line (which manhole is intended for the purpose above described) are water-tight, so far as careful work can make them. House connections are entered in 4-inch Y pipes, and the ventilation for both sewer and house drain is provided for by a 4-inch pipe, connecting outside each and every house, extending from the main drain of each building just below the running trap, to some point above the chimneys. (See Fig. 8). This provides not only for the ventilation of sewer and house drain (the latter is rarely ventilated between the running trap and the sewer, though apt to be fouler than any portion of the public sewer), but it also causes each house drain to ventilate its proportion of the system, and prevents the usual concentration of the gases at a few points.

All ventilation being above the top of the house, there is very small chance of annoyance from smell, and so far as known there has been none noticed at any point save slightly at the perforated manholes at the foot of the trunk lines, and in three instances from "puffing" of fresh-air inlets to house drains—both of which were disconnected from the sewer and drain ventilation referred to.

Many of the houses at Nahant being provided with privies instead of water closets,—and privies, too, of the poorest possible type,—a style of earth privy was adopted, as being perhaps more easily attended to than any other, and at the same time capable of being used, but not abused.

Any privy whose contents are received in a leaking vault, is undesirable, and when such vault is, as is not uncommonly the case, used as general slop-hopper as well, and the soil in the immediate neighborhood drenched periodically with the family filth, it should always be viewed with distrust.

At such points as seemed permissible, the option was given between the tub set on the slanting

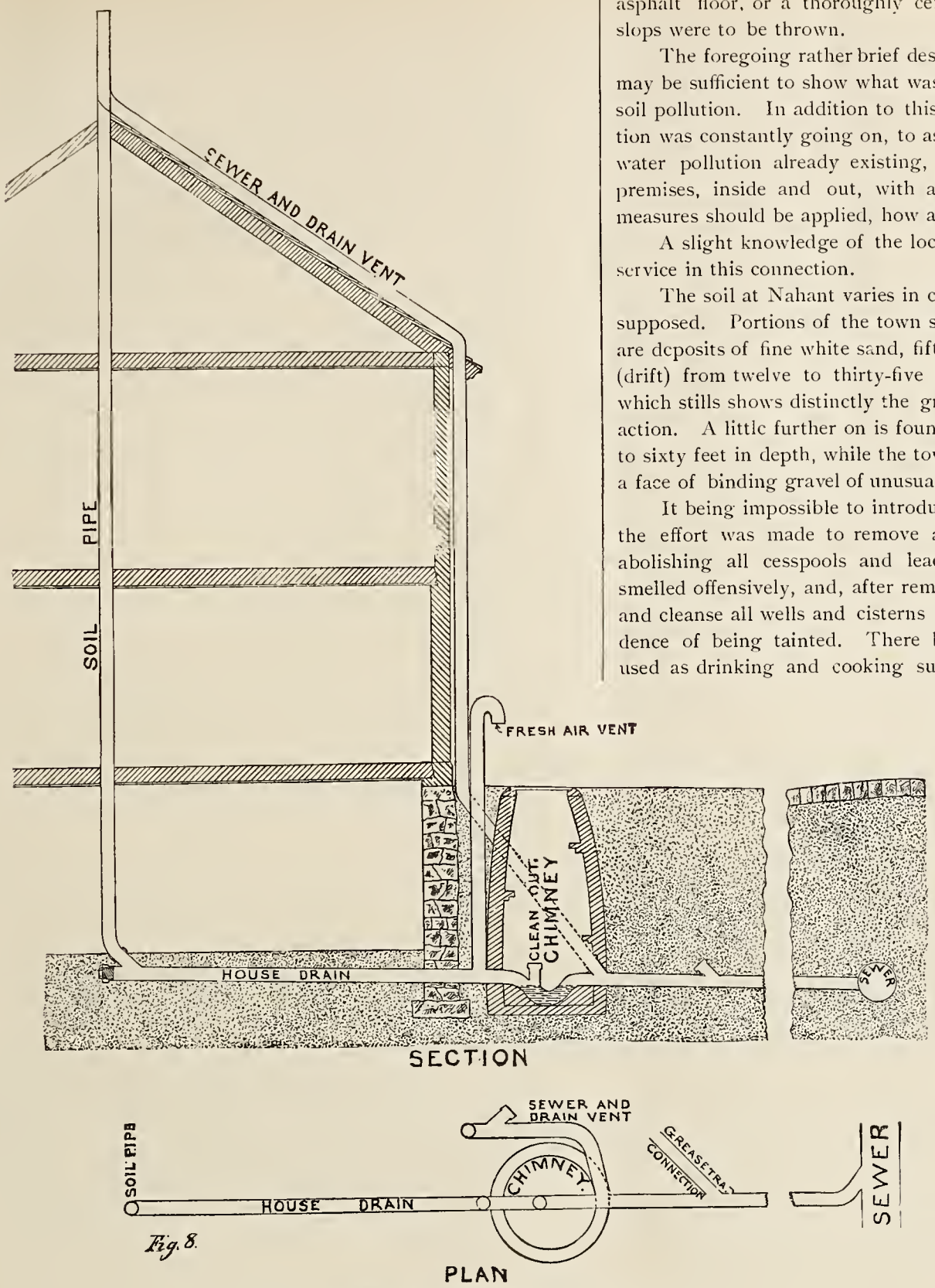


Fig. 8.

HOUSE CONNECTION, SEWER AND DRAIN VENT.

asphalt floor, or a thoroughly cemented shallow vault into which no slops were to be thrown.

The foregoing rather brief description with the accompanying plates may be sufficient to show what was done at Nahant, to prevent further soil pollution. In addition to this, and at the same time, an investigation was constantly going on, to ascertain the amount of both soil and water pollution already existing, the general condition of individual premises, inside and out, with a view to determining what remedial measures should be applied, how and when.

A slight knowledge of the local geology of the peninsula may be of service in this connection.

The soil at Nahant varies in character much more than is generally supposed. Portions of the town show solid rock outcroppings; near by are deposits of fine white sand, fifty feet deep, or loose running gravel (drift) from twelve to thirty-five feet deep, and overlaying the ledge, which stills shows distinctly the grooves and markings of former glacial action. A little further on is found stiff bluish brick clay from twenty to sixty feet in depth, while the town gravel-pit at the west end exhibits a face of binding gravel of unusually good quality.

It being impossible to introduce public water on such short notice, the effort was made to remove all known sources of contamination, abolishing all cesspools and leaching vaults, draining marshes that smelled offensively, and, after removing all causes of filth, to pump out and cleanse all wells and cisterns that afforded chemical or physical evidence of being tainted. There being hundreds of wells and cisterns used as drinking and cooking supplies, hundreds of chemical analyses were made, in the first instance to determine the general character of the water, and afterwards to ascertain what effect, if any, was produced (after removal of the supposed sources of trouble) by the pumping out and cleaning.

In many instances there was little or no improvement in the quality of the water, in others it was appreciably benefited, and occasionally, so far as could be ascertained chemically, waters were rendered entirely satisfactory, that were previously classed as decidedly injurious.

In the case of cistern water this might be expected in perhaps a majority of cases, and in a measure well water might show change for the better, though hardly to the extent indicated.

MALARIA—I.

BY THOMAS W. HARVEY, M. D.

It will be well to confine our discussion to the etiology of malaria. By malaria I mean a cause and not a disease, specifically the cause of periodic fevers.

It has long been the opinion of the mass of observers, that malaria requires for its developement the three conditions of heat, moisture and vegetable decomposition; that, in its nature it is either a miasm or a germ; that it enters the animal economy by way of the air passages. That malaria requires for its development and activity these three conditions is undoubtedly true, the converse, however, not being true, namely, that given these conditions, malaria will be present. Not all forms of vegetable decomposition seem to be favorable, and we do not know what temperature is necessary, nor what amount of moisture. But these conditions being present, another factor, as yet unknown, may become active, and the results are malarial poisoning in its myriad forms. Further, many regions may present these conditions and have none of the effects of malaria, or be free from it for a term of years and it will appear and remain for a time. Again, malaria and its effects may be found where we least expect it, and where these necessary conditions seem absent, as in arid plains. Here a closer examination will show that the conditions favorable for the production of the poison may be found in the lower layers of the sand, while the surface parched, dry and cracked, allows the egress of the poison.

Without going into the numerous examples that may be found in medical and sanitary literature, of malaria presenting itself in unexpected places, I think we can say that one of the conditions almost uniformly present is that of the saturation of the soil due to the obstructing of the natural flow of the ground water by natural or artificial obstructions, as irregularity of stratification or mill-dams. We are in danger of losing sight of this effect of mill-dams in the present tendency of thought, particularly as we have recently had, in a noted trial in Massachusetts, the effect of mill-dams in causing malaria made little of and scouted as an antiquated theory. But New England is not a good place for studying malaria, nor are its sanitarians as familiar with the phenomena of its production as those of other places. We know, indeed, that New England has been remarkably free from malarious disease for years until recently. And what do we discover now? The well-attested fact that these diseases are found in localities similar to those in other parts of the country where it prevails; and the fact is interesting that in this trial no cases of disease were noted below the dam. We have, besides, the

results of removing these obstructives and properly draining the sub-soil. I can recall the experience of one of the oldest physicians in the state, whose practice extended over a large part of Essex county, who remembers the time when there were fifteen mill-ponds within five miles of his house. These ponds were the centers of many malarial diseases. These ponds have gradually disappeared, and their localities drained, with the result that the chills are no longer known in their neighborhood. I would add to this my own personal observations, which will be given in detail in another place. There is no reason why we should ignore the well-attested fact of the relation of saturated soil to malaria, because we are no longer looking to marsh miasm as a cause. Every germ requires for its development a suitable soil and environment. This environment may be on the rock of Gibralter, the flats of Holland, the wayside ditches of England, the salt marshes of New Jersey, or the mill-ponds of New England. They are harmless, yet receptive, so long as the special cause is not present.

One of the opponents of the germ theory of malaria has urged the fact that there are years and series of years when the malarial poison is very active, and when it enters new fields hitherto untouched or not visited for many years, and then there will be years when it is very mild or absent. There appear to be waves of malarious influences with ebb and flow affecting the country. Now this fact certainly bears a strong resemblance to the life history of other living things, and is a strong argument for the existence of a contagium vivum. We have our seasons of mosquitos, our seventeen-year locusts, our years of potato-bug plague, our plum-tree blight, our apple years ; and why should we not have our malarial germ seasons ? We certainly do. During the last five years we have been suffering from one of these visitations, as recorded in the reports of the districts medical societies, while this year, 1883, has been rather freer from such diseases.

This brings us to the consideration of the nature of the poison. From the times of Lancisi, whose studies of the fevers of the Pontine marshes have been the basis of all treatises on malarial fevers for the last two hundred years, it has been thought that the poison was gaseous and an emanation. But McCullough quotes Lucretius, Varo and Linnæus as believing that the symptoms of intermittent were due to animalculæ invading the body through the lungs. Of late years, if we except Dr. J. H. Salisbury and his Palmellæ, little has been done towards demonstrating the nature of malaria until the experiments of Klebs and Crudeli. These investigators, it will be remembered, made many experiments in the Pontine marshes, the classic home of malaria. They claim to have isolated a germ, to have cultivated it, and to have produced periodic fevers in animals by inoculation. They have called their germ the bacillus malariæ. These experiments have been repeated in this country by Dr. Sternberg, of the United States army, under the direction of the national board of health, and his conclusions are as follows : " While, however, the evidence upon which Klebs and Tommasi-Crudeli have based their claims to a discovery is not satisfactory, and their conclusions are shown not too well founded, there is nothing in my researches to indicate that the so-called bacillus malariæ, or some other of the minute organisms associated with it, is not the active agent in the causation of malarial fevers in man. On the other hand, there are many circumstances in favor of the hypothesis that the etiology of these fevers is connected, directly or indirectly, with the presence of these organisms or their germs in the air and water of malarial regions."

These conclusions, I think, may be said to embody the opinion that any one would have whose mind is at all receptive of new ideas, and yet is so well balanced as not to be affected by every post-hoc argument that may be advanced. There is no doubt that the generalizations of the germ theory of disease account for and harmonize more facts than those of any previous theory. We can only say regarding malarial diseases, that such a theory would account for the phenomena of their development and prevalence and their relation to heat, moisture and vegetable decomposition, but that the existence of the germ has not as yet been satisfactorily demonstrated. The avenues by which the poison reaches the system of its victim have hitherto been thought to be the lungs. This grew out of the idea of the aerial nature of the poison. But the ancients always advised against the drinking of water from malarial regions, and of late years an occasional voice has been heard claiming that malaria may enter the economy by way of the alimentary tract through the agency of drinking water. This possibility had been often impressed upon my own mind, and inquiry among sanitarians developed the fact that this effect of drinking water has not been generally acknowledged, and it is to call attention to this relation of drinking-water to disease that I have presented this paper.

During the last five years I have had under observation a locality that presents the following conditions: Essex County, as an entirety, is not particularly malarious ; on the contrary, there are large areas where the disease is almost unknown ; and, further, where these diseases do prevail, they do not present themselves as very severe, and rarely ever appear in the death statistics. Yet various localities may be found where the several forms of malarial diseases prevail. The city of Orange and the township of East Orange, form in every respect, except as to civil boundaries, one and the same town. They deservedly have an envied reputation for healthfulness, and are inhabited by citizens whose intelligence and wealth are above the average, and who would not continue to live there if Orange were not healthy. North of these two towns lie Montclair and Bloomfield, Bloomfield being the most easterly and on lower ground. The geological conditions have often been described. On the northwest are the trap dykes of the first and second mountain ; from these extend east, south and west the great red sandstone plain,—here, no longer a flat plain as at Plainfield, but thrown in undulating waves that, parallel to each other and to the trap rock, repeat themselves as little hills and valleys until the Passaic river is reached. The valleys have been deeply filled with the debris of the glacial and later periods, and the sandstone is found at various depths below the surface, while the rock often crops out on the top of the ridges. Orange occupies the summit of the water-shed of the east branch of the railway and the second river, a branch of the Passaic. Four-fifths of the surface water and, consequently, of the town drainage, find their way to the northeast until, reaching a point between Orange and Montclair, the little brooks collect into a small stream, and, cutting through the sandstone ridges, flow eastward between the Oranges and Bloomfield, and at last through Bloomfield to the Passaic. The radicles of this stream flow through the city Orange with a fairly rapid descent and unimpeded course, until they reach the northern boundary, and then for about one-half of a mile the descent is about twenty feet; but the course of the stream is impeded by two mill-dams setting back the water for almost the whole distance, and it is to this small area that my observations are to be directed. In addition to these obstructions to the flow of the brook and the ground water, there is a still further obstruction in a large artificial ice-pond, fed by springs situated near, but not receiving the water of the brook. The level of a part of this pond is raised above the surrounding level by a dyke. The cellars of many of the houses are below the level of the pond and of the brook. A road runs parallel to the brook, which is lined with houses. Crossing this road at right angles is another road bordering on the south the pond, and on the north a little branch of the brook, whose current is also affected by the setting back of the water from the mill-dams. This street is also lined with houses. West of this street there are several short streets, which occupy the site of an old swamp, the remains of which may still be seen. We have, then, a T-shaped section in close relation to the second river, about one-half of a mile long, one-quarter of a mile wide at its widest, and a few hundred yards for most of the distance, and in this section malarial fevers have been endemic for many years. The houses are mainly occupied by mechanics ; many are occupied by two or three families. The wells in this region are most of them shallow, dug-wells rarely more than twelve to fourteen feet deep, supplied entirely from the superficial layers of soil. During wet seasons and heavy storms, the brook easily overflows its banks, the cellars contain more or less water, and the wells fill nearly to the surface. There is little doubt that, if the mill-dams were not present, the brook could be confined within its banks.

HYGIENIC INSTRUCTION IN COLLEGES.

The Sanitary News is under obligations to Dr. A. L. Gihon, of the United States navy, for the following statement of the colleges in this country and Canada, which have chairs of sanitary instruction, together with their tities:

PROFESSORSHIPS.

Hygiene—Rush Medical College, Chicago.

State Medicine and Hygiene—College of Physicians and Surgeons, Chicago.

Sanitary Science and Hygiene—Fort Wayne (Ind.) College of Medicine.

State Medicine and Sanitary Science—University of Louisville, Ky., Medical Department.

Public Hygiene—University of City of New York, Medical Department.
Public Hygiene (also an Emeritus Professor of Hygiene)—Woman's Medical College of New York Infirmary.
Hygiene—Williamette University, Portland Oregon, Medical Department.
Sanitary Science—Royal College of Physicians and Surgeons, Kingston, Ont.
Hygiene—University of Bishop's College, Montreal.
Sanitary Science—Trinity Medical College, Toronto, Ont.
Clinical Medicine and Hygiene—Minnesota College Hospital of Minneapolis.
Hygiene and Forensic Medicine—St. Louis Medical College.
Physiology and Lectures on Hygiene—Southern Medical College, Atlanta, Ga.
Physiology and Hygiene—Quincy (Ill.) College of Medicine.
Physiology, Pathology, General Therapeutics and Public Hygiene—College of Physicians and Surgeons, Keokuk, Ia.
Physiology, Clinical Pathology and Hygiene—Iowa College of Physicians and Surgeons, Des Moines, Iowa.
Physiology and Hygiene—College of Physicians and Surgeons, Boston, Mass.
Physiology and Hygiene—College of Physicians and Surgeons, New York city.
Physiology, Pathology and Hygiene—College of Medicine, Syracuse, N. Y.
Physiology and Sanitary Science—Long Island College Hospital, Brooklyn, N. Y.
Physiology and Hygiene—Woman's Medical College of Philadelphia.

ADJUNCT PROFESSOR.

Medical Jurisprudence and Sanitary Science—Toronto School.

LECTURES.

Hygiene—Woman's Medical College, Chicago, Ill.
Hygiene and State Medicine—St. Louis College of Physicians and Surgeons.
Demonstrator of Anatomy and Lecturer on Hygiene—St. Joseph's (Mo.) Medical College; also McGill University, Montreal.
Physiology and Hygiene—Center College, Danville, Ky.

THE latest fashion in gas chandeliers indicates a return to simpler designs. The heavy, conglomerate patterns of a few years ago having been entirely discarded in the Eastern cities. In the salesroom of the Vosburgh Manufacturing Company, 184 and 186 Wabash Avenue, are to be seen some excellent examples of these attractive chandeliers, those of Flemish design, with their graceful curving branches, being the best. In polished brass, either plain, or with the central globe from which the branches spring of hammered metal, it becomes, in a well-appointed room, an object of genuine and permanent beauty. When an antique effect is desired in a room, this Flemish design in old, dull brass is in excellent accord. More elaborate renaissance designs, with floral ornamentation in repoussé, or perforated work, combine polished bronze with copper or oxidized silver. Side brackets, which are in favor with those people who affect the English fashion of dimly-lighted rooms, are found in corresponding patterns. A very brilliant effect is obtained by the crystal pendants which ornament many of the new fixtures. These are somewhat glaring in a room which is constantly used, the eye tiring of the ceaseless glitter; but a hall burner of simple polished bronze, with two circles of pendants, is very bright and pleasing. There was never so great a variety, nor such exquisite work shown in globes as at present. A passing fashion has brought colored glass into high favor for this purpose, and many delicate tintings are found in plain, crackle and figured glass. Some opalescent globes, with colored jewels set at intervals in the cloudy surface, are rather obtrusively showy. The most satisfactory and by far the most artistic globe, is of white ground glass with a delicate, etched design, and it serves the purpose for which it was intended honestly, softening the glare of the light, without making it dull and lifeless, as it becomes when seen through colored glass. Some cut-glass globes show fine work and are pleasingly brilliant. The flaring shape is popular at present, several forms of lily design being shown. At the same store are to be seen kerosene fixtures in great variety and unusually good patterns. They follow closely the best forms of the gas chandeliers, the Flemish designs being quite as accurately carried out.

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KENSINGTON embroidery, which has been so popular during the last few years for decorative purposes, is yielding somewhat in favor of arrasene, chenelle and ribbon work. The raised designs and the strength and boldness of effect gained by the use of these newer materials make them much more satisfactory for ornamenting hangings and furniture coverings than silks and crewels. For the same reason, appliqué work is in high favor, especially for portieres and other large pieces where breadth and vigor of treatment are desired. This work employs the richest materials, and is used in very elaborate designs. An elegant portiere, recently made in this city, from designs by R. W. Bates, is thoroughly artistic in its applied decoration. The hanging is intended for a hall which has a deep wainscoting of mahogany and is peacock blue plush, a color which is in admirable accord with the dark rich wood. The dado simulates square tiles and a light balcony in shades of olives and pomegranate plush outlined with gold. Above this dado rises a branching orange tree, its trunk, leaves and full golden fruit applied in plush and silk in the natural colors, and finely brought out by the blue background. The accuracy of the design and the changing lights of the rich fabric make the effect extremely rich. The reverse side of the drapery which hangs in a Moorish room is of crimson mottled plush, with a dado and frieze of applied geometrical figures in gold brocaded velvet. Below the dado hangs a deep knotted fringe. A novel use of appliqué work is seen in two large wall panels to be used in a hall. The designs which were made in this city were sent to Lyons, and have been carried out with wonderful realism by the skillful French workmen. One panel shows the nearly life-size figure of a troubadour playing upon a lute; the other, a lady in Marguerite costume, leaning forward with her hand on a door. The costumes are of satin, plush and velvet, the faces and hands of leather painted to the life, and the figures are set against backgrounds of Japanese cloth of gold painted to represent the one, an outdoor scene with landscape and castle, the other the interior of a hall. A larger and more elaborate work than either of these shows the figures of Faust, Marguerite and Mephistopheles, with the arches, roofs and spires of a city behind them. It is a wonder of skill and careful work, and is very brilliant in the colors of its rich costumes, while one's first glance at the figures gives a startling impression of life and reality. Works of this description, to be worth anything, must be perfectly done, and the cost of these elaborate decorations will place them far beyond the reach of people of ordinary means, although they may suggest something attainable for wall ornamentation.

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A NARROW shelf on simple brackets placed over a doorway, and painted like the woodwork of the room, is a pleasing and artistic addition, and can be easily put up by any carpenter. A few pieces of pottery, good in color and shape, though not necessarily rare or costly, may be grouped upon this shelf, forming a very effective decoration. In these days, when many of the better qualities of sauces and potted meats are put up in jars and jugs of really artistic form and color, it is not necessary to resort to old pie-plates gilded and painted, or plaster figures colored to imitate brass and bronze. Some jugs of excellent shapes are found in a durable English ware in mottled olive or dark bright blue, with a raised decoration, at very moderate cost. A plaque of beaten brass which anyone can make with a little skill and practice, an olive jug, a slender vase of brilliant yellow Japanese crackle, and a clouded blue-gray jar, which can be found at the grocer's, and which, after it is emptied of its contents in the kitchen, is worthy of being promoted to the position of artistic bric-a-brac, will make an effective combination of color and shape, which will be a continual pleasure.

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A VERY pretty shade for a chandelier globe is made of a band of bright satin ribbon two inches wide, gathered slightly at the upper edge to fit just above the largest part of the globe. The lower edge is bordered with antique lace about three inches in width, finished with a

fringe of embroidery silk of the color of the ribbon, knotted into its pointed or scalloped edge. A chandelier of three globes has shades repeating the colors of the furniture, one with ribbon and fringe of crimson, another of yellow, and the third of dull blue.

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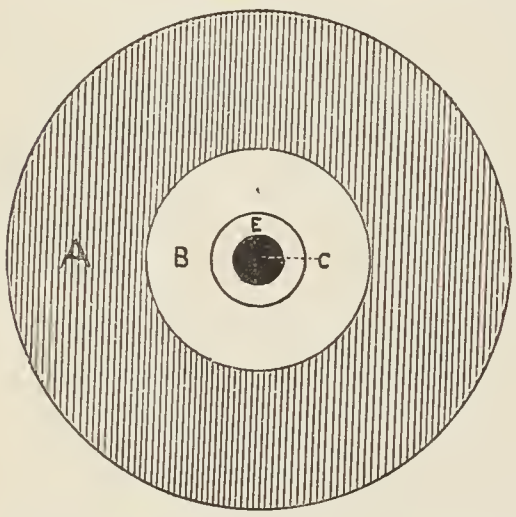
The recent severe cold weather renders pertinent the suggestion that fresh air is quite as necessary in a house when the mercury outside indicates twenty degrees below zero, as during the heat of summer. Double windows, weather strips and fire combine to render the air of a house lifeless and tainted unless special care is taken to ventilate both living and sleeping rooms daily. The cold air of a closed, fireless bedroom is not necessarily pure. Martha Howe-Davidson.

THE MANUFACTURE OF SANITARY APPLIANCES.—IV.

LEAD PIPE AND SHEET LEAD.

In the construction of what are commonly termed sanitary appliances in a house, lead enters very largely into the catalogue of materials. Lead pipe is used for waste-pipes, water-pipes, overflow-pipes, and sometimes, though seldom, for soil-pipes; sheet-lead is used largely for drip-trays, and lining for water-tanks, etc. Galena, as it comes from the mine, contains silver and gold in varying quantities. The ore is reduced in smelting-works, the silver and gold extracted, and the refined lead made into pigs, or ingots, in which shape it is received at the lead manufactories. The machinery for making lead pipe consists of a copper-lined, hydraulic cylinder, ram, and cross-head having an opening in the center, and supported by four corner columns attached to the hydraulic cylinder. The bed of the hydraulic press is supplied with an iron or steel cylinder which contains the lead, the aperture in which is just the size of the ram. To the cylinder is fitted the ram, within which is placed a die the diameter of the entire pipe. This die, when the press is in operation, is entered by a core the size of the inside diameter of the pipe. The cylinder, in the center of which stands the core, is filled with molten lead by means of a portable conductor leading from the kettle in which it is melted. The lead need not necessarily be melted, were it possible to place it in the cylinder cold and have it of equal density. This being impossible, it is melted. The cylinder having been filled with about one hundred and eighty pounds of lead for a pipe of five-eighths inches inside diameter, and three-sixteenths thick, the lead is allowed to solidify to a certain extent. The hydraulic machinery being then set in motion, the cylinder (filled with lead, in the center of which stands the core), rises slowly until it meets the ram or plunger, containing the die. The plunger presses against the lead with a force according to the size of the pipe to be made, varying from one to ten thousand pounds. The lead having no other means of escape, passes in a continuous flow up the space between the die and the core, forming a pipe of even thickness, and without joints. This description may be better understood, perhaps, by reference to the accompanying illustration of the plan of the lead cylinder. A is the lead cylinder having an aperture, B, which will just receive the plunger; C is the core which is in diameter equal to the inside size of the pipe. E is the space between the die and the core into which flows the lead forming the pipe. When the lead in the cylinder is exhausted, the return motion of the hydraulic press lowers the empty cylinder and the core to its former position, when it is ready for another charge. The pipe which is being formed, rises up through the hole in the cross-head to a floor above, where it passes over a large, grooved wheel and is received on reels. One charge of the machine makes one coil of pipe. It is then tied and weighed. The joints occurring in the pipe between the end of one charge and the beginning of another, may be made as solid as any other portion of the pipe. There was on exhibition at the first Chicago exposition a reel containing one mile of continuous lead pipe one-quarter of an inch in diameter. When the pipe is coiled, it is customary to cut out these joints with about three inches on either side, to insure a perfect pipe. Aqueduct pipe is always put up on reels. All pipe over two inches in diameter is made in lengths. All weights and sizes are made by the same process, from one-quarter inch tubing, weighing six ounces to the foot, to waste-pipe six inches in diameter, weighing twelve pounds to the foot. The same hydraulic process is employed in making block tin pipe (solder), excepting that no core is required. Sheet lead is made by melting the metal in a large kettle and running it into a large iron pan eight feet by four feet, by four inches deep, holding seven thousand pounds. It is allowed to cool in this large slab. After becoming solid, the slab is placed on a revolving cylinder road-way and passed forward and back between large iron rollers until it is a huge sheet about fifty feet long by eight feet wide and three-eighths of an inch thick. It is then cut into smaller sheets, about four feet by eight feet, and these are run through the rollers until the proper thickness is reached. Sheet lead one-sixteenth of an inch thick weighs four pounds per square foot; one-quarter of an inch thick weighs sixteen pounds per square foot. The sheets average in size, seven and one-half by twenty feet.



For the information necessary in the preparation of this article, The Sanitary News is indebted to Messrs. E. W. Blatchford & Co., manufacturers of lead pipe, sheet and bar lead, Chicago.

DESTRUCTION OF BACILLI BY WATER.

Dr. Emmerich of Munich, (in a paper in *Vierteljahr'sschrift für öffentliche Gesundheitspflege*, Vol. xv., 1883, page 62), states that by means of his own researches the author had found that blood taken from a sheep infected with anthrax, and used in fractions of a drop for the inoculation of rabbits, produced fatal results in less than twelve hours. Whereas one cubic centimetre of this same blood, violently agitated with two hundred times its weight of Isar water for two hours, and used in quantities of twenty-five cubic centimetres for sub-cutaneous injection into rabbits, was wholly without evil effects, although as seen in the microscope, the fluid contained thousands of the anthrax bacilli, and the volume used for injection in the latter case conveyed at least ten drops of the infected blood. He believed that he had been able to prove that the specific poison of anthrax lost its power by agitation in the presence of water. In the same way he had shown that sewage-water, which, when used without dilution, produced fatal results upon rabbits in from twelve to thirty-six hours, lost its evil effects if agitated for several hours with an equal volume of river water. He considered, therefore, that he had established the extremely important facts that the movements of the air and the movements of water are the great purifying processes of nature, and that the cleansing powers of rivers are due to their rapid motion.

DISEASES CAUSED BY SANITARY DEFECTS IN HOUSES.

Dr. Charles Kelly, professor of hygiene in King's college, England, recently, in lecturing before Parkes' museum of hygiene on this subject, traced epidemics of the contagious diseases, showing some which he ascribed to sewer-gas entering the houses from unventilated sewers. In some cases, sewer.gas, escaping at the street ventilators, had been the alleged cause of sickness. He stated that diphtheria was, in some cases, caused by sewer-gas, but thought that cold and damp were predisposing causes, if not the origin of the disease.

THE EDUCATION OF APPRENTICES.

At the last meeting of the Chicago master plumbers' association, held on the evening of Jan. 2, a paper was read by Mr. J. J. Hamblin, on "The Education of Apprentices." By way of introduction, Mr. Hamblin called attention to the fact that before an apprentice could be educated he must be secured. While many masters believed that they had apprentices it really was not so, as the boys were only waiting for something else to do. The boy must have a desire to learn, or the attempt to teach him would be futile; he should have good morals and a common school education, if he were to be made useful. In the new era which had dawned upon plumbing a "new profession" had brought to the front a class whose knowledge was obtained from books. It had thus become necessary to do more than "shop educate" apprentices; master plumbers, too, needed to take advantage of the new opportunities, or the "new profession" would step in between owner and builder, and the craft would become as "hewers of wood and drawers of water"—"at the mercy

of a broadclothed profession who get the kernel and give us the husks." With the desire for improvement foremost in the minds of the masters, it would not be long before meetings for instruction by lectures from the more advanced of the craft, and others learned in the theories of the trade, would be held. Every inducement should be held out to the apprentice to attend, and he be made to feel that his calling was not only that of laying pipes, or setting sinks, but, also, a scientific trade. Mr. Hamblin thought that the education of apprentices and masters alike would be much aided by the establishment of a circulating library owned by the association and controlled like the public library. As a beginning he suggested that every member should donate some work, thus forming a nucleus around which there would be growth. "Our heads," he said, "are not too old to learn the new scientific knowledge pertaining to our trade, our tongues not too stiff to mouth the extra scientific terms." Once abreast of the times, it would not be difficult to stay there, but "much more difficult for a sanitary engineer barnacle to be fostered, and grow fat, on our trade." "This education," he continued, "should be supplemented, if possible, by a collection of the latest novelties and appliances, patented and otherwise, in the rooms of the association; so arranged that both master and apprentice may see and understand their use; such appliances will soon impress the latter with the difficulties to be overcome and cause him to reason correctly as to how this is to be effected. While this subject might be greatly enlarged upon, action, not words, is what we must have. The apprentice system now in vogue can be made to work satisfactorily, and what has been urged for their education will aid materially to bind the apprentice to the trade, give him a higher estimate of it, and eventually elevate the craft both in its own estimation and that of the world."

In further proceedings of the meeting resolutions were adopted thanking Robert Brown & Sons of Paisley, Scotland, for the gift of plumbers' goods received.

Messrs. Wade, Bain and Harvey were appointed a committee to cooperate with the health department in securing good plumbing in the city.

Messrs. Sims, Clark and Tipple were named as a committee to look into the matter of state incorporation.

A resolution was adopted constituting the association a standing committee to examine into school sanitation.

A communication from the St. Louis master plumbers' association, in which they stated that they were doing exceedingly well, was read by President Young.

A vote of thanks was extended to Dr. Oscar C. DeWolf, commissioner of health, for his address before the association on the evening of Dec. 19. President Young announced that Dr. DeWolf would address a public meeting, later, in the interest of the city's sanitation, and the work of the association.

Vice-President Boyd read a communication from Mr. Abram Mead, of New York, in which the latter stated that he had corresponded with leading plumbers in 148 towns and cities, urging the formation of new associations.

Mr. J. J. Bufton was elected a member of the association.

NEW YORK PLUMBING AND PLUMBERS.

[*Special Correspondence* THE SANITARY NEWS.]

NEW YORK, Dec. 26, 1883.—That there is a very high class of plumbing done now, in this city, is generally admitted by property-owners and every one who has any knowledge of the craft in recent years.

New York plumbers, take the best of them,—those who have a standing and an established reputation, as well as younger men who are making themselves known by good work,—need fear no comparison with any body of mechanics in the world in the same line. Recently, an agent representing a company who claim to have a plan which ought to supersede all other methods in plumbing, approached a gentleman who is building on Madison avenue. The gentleman, after a patient hearing, informed the agent that nothing could be better than the plumbing he had had done of late years, and that the "system" of New York plumbers was all that could be desired when a job was fairly paid for. An examination of the plumbing of the Seventh Regiment armory (done by Thos. H. VanTine & Son); the Union League club, or Vanderbilt's Fifth avenue mansion (John Toumey); the Western Union building, or the Field building, at the Battery (Locke & Munroe); the Mills building, the new St. Vincent's hospital, New York hospital, or any of the great hospitals done by Thos. J. Byrne; the enormous Berkshire apartment house on Fifty-second street (Harkness Boyd); the Metropolitan opera house (John Miller); any of the great buildings on Madison avenue, Twenty-third street, Fifty-ninth street (Navarro flats), or the "Mount Morris" flats in Harlem, done by Joseph A. McDonald; and a host of prominent structures, public and private, will prove the skill, excite admiration for, and attest the progressive spirit of the plumbing trade.

Of course there is a great deal of poor work done by another class, who do not seem to care whether the pipes are made of paper, or the joints cemented with oatmeal porridge, so long as they get through with their contracts. These men lend themselves to speculative builders of the baser sort, who run up thousands of cheap houses and flats every year, who "skin" everything and everybody so far as they can. The deluded people who pay high rates for the inestimable privilege of living in these flimsy affairs are semi-contented, because, forsooth, are they not "numbered among the Manhattanese;" and a residence in Gotham compensates, they think, for contracted quarters and bad sanitation.

The plan of sending out specifications from architects' offices for bids, the contract being awarded to the lowest bidder, is responsible for much bad work, especially as the owners (often impecunious borrowers) only want a cheap job to begin with. It is as reasonable to expect a jockey to sell a "flyer" for $50, or a carpenter to put up a four-story house for a "two-story" price, as to think that a $1,000 plumbing job can be done for $400, as many persons do.

Plumbers labor under many disadvantages, and I think that, on investigation it will be found that there is no business (in New York at least) where so much money is invested, which has so small a margin of profit or yields so little return for the amount of labor spent. Wages are high; there is a great deal of waste; work does not come in evenly (it is either a rush or a lull) and in addition to all the other drawbacks to legitimate profit, people usually want first-class material and work for a ninth-class price, when dealing with the plumber.

However, there are a number of firms on this wonderful island that refuse to do poor work at any price, and who seldom have to let a good workman go for lack of something to do. Heading the list of these old reliable firms we can justly place Thos. H. VanTine & Son, of Sixth avenue and Waverly place, who have been honorably known for excellent work for thirty or forty years. Mr. VanTine, the elder, is a gentleman of the old school, who believes that a quiet, carefully-conducted business is better than the rush and worry of the more modern style of a "big trade" with its attendant risks. His son, Mr. T. H. VanTine, jr., on whom the main burden of the business now rests, shares these views. "Our business," he says, "is necessarily a limited one; a man can only attend to so much if he would do things properly." Mr. VanTine, jr., has been a captain in New York's crack regiment, the Seventh, for eighteen years. He retired from that noted organization some time ago to devote himself more fully to his business, which is large and flourishing, though, as I have intimated, not on the extensive scale affected by some others.

Another old-time plumber is Mr. James Henderson, of Sixth avenue, near Bleecker street, than whom there is, probably, no better plumber in the United States. Mr. Henderson is a thorough mechanic and very original, both as to his ideas and style of work.

Byrnes & Brady have been established at Seventh avenue and Thirty-fourth street since 1854, and do a large business. They are known and esteemed as among the most upright and square-dealing men in the trade.

R. Fraser, Eighth avenue and Twenty-ninth street, has been where he now is about twenty-nine years. He is a capital plumber, and a man very much respected.

Edward Murphy, the secretary of the National association, whose shop is on Third avenue, near Thirty-ninth, is an enthusiast in all sanitary matters and a splendid mechanic. Any new and novel idea or invention never fails of Mr. Murphy's interest, and his place is a sort of museum.

John Montgomery is still in Ninth street, near Broadway. He is a refined gentleman, and his son, Archibald Montgomery, exhibits the advantages of a thorough education applied to a mechanical business.

Scott & Newman are located at their old stand, Ninth avenue and Nineteenth street. Col. Scott commands the Eighth regiment—"Washington Greys,"—and has the honor of being the first president of the

national plumbers' league. He is a first-rate presiding officer and holds office in a great many organizations, civil and military. Capt. VanTine, Gen. Locke and Col. Scott are none the less good practical plumbers for their military titles.

I might speak of other old-time "square" plumbers—T. J. Fitch, Third avenue and Forty-eighth street; Alex. Henderson, Seventeenth street and Bivay; James Muir, Eighteenth street and Bivay, whose reputation and business are unexcelled by any in Gotham; Pearson & Denike, Sixth avenue and Thirty-sixth street; J. P. Quinn, now at Fourth avenue and Twentieth street, under whom many of the master plumbers of to-day served their time; Alfred Ivers, the Nestor of the plumbing trade, Fourth avenue and Twenty-fourth street; S. & A. Clark, a few blocks above; A. B. Sands, 11 Beekman street; W. F. Conran, of Pearl street, who does most of the city's work; George Dunn, also in Pearl street, who manages estates as well as a plumbing establishment; Thos. J. Byrne, who is now plumbing the Cotton Exchange; and Locke & Monroe, who have done a great business from "away back." Gen. Locke is one of the best-known men in New York. I might also say something about Mead & Rossman, of Fourteenth street; N. G. Geraty, of Third avenue and Seventy-third street; John Toumey, of Park avenue, who stands second to none for first-class work; Alex. Whitelaw, Fourth avenue; Wm. Young & Bro., Third avenue; Daniel Carroll, Thirty-third street; R. Cummings, Hudson street; Frank Reynolds, Third avenue and Forty-ninth street; and his former partner, genial James Gilroy, now on Fourth avenue at Sixty-third street; E. L. Vermilye, of One Hundred and Twenty-fifth street, one of the most conscientious and thorough mechanics to be found anywhere; Michael Sexton, who is a genius in his way, full of quips and quirks, a droll story-teller, whose place at Third avenue and Sixty-third street is a half-way house between the city hall and Harlem for plumbers, who stop as often as they can, in their journeys up or down town, to have a chat with Mike as well as to examine his patent flush-tank and other inventions; McAuliffe & Gabay, William Vail, Charles Tucker, W. P. Austin, Morton & Bathe, Philip Brady, J. J. Sullivan, John McCarron, E. B. Cunningham, H. C. Price, John Miller (whose work at the new opera house is a standing advertisement), I. O. Shumway, T. C. Townsend, and the many good plumbers of this metropolis. All these are pre-eminently "pleasant men"—urbane, sociable, and a credit to the trade of which they are the leading representatives.

I shall have a word about others in Gotham and also Brooklyn and New Jersey, in later communications, with descriptions of work now in progress, together with illustrations, etc. H. S. R.

IRON, VERSUS LEAD, SOIL-PIPE.

To the Editor of The Sanitary News:—In perusing your latest issue, I find a communication from Mr. David Whiteford, of your city, and in some of the points to which he has drawn our attention I fully concur with him; in others, I must beg leave to differ with him. In the first place, let me observe that I do not operate a lead machine, neither do I own one, nor am I interested in an iron foundry. I am a traveling salesman, selling plumbers' supplies, and if the trade must and will have iron soil-pipe I will sell it to them; but I will never advocate the use of it until I am more positive than I am now of its superiority to lead soil-pipe. I have had an experience of more than twenty-five years in the business, practically, and I can refer you to work which was done in New York city over forty years ago where lead soil-pipe was used, and the said pipe was thoroughly examined last winter by an expert and found to be in as good condition as when it was first put up. When I claim that lead soil-pipe is superior to iron, I do not mean the kind that weighs four pounds per lineal foot, but that which weighs eight or ten pounds per lineal foot. The manner in which I would put it up would be as follows: First, fasten a plank, one and a quarter inches thick, in the niche left for the soil-pipe; then commence at the bottom of the "stack" and work up. Wipe every joint upright; never make a flange joint on lead soil-pipe, as the lead is hardened by drawing it over on the floor, and the weight of the pipe soon breaks it off. Put your stays not over twenty-six or thirty inches apart; screw the stays to the plank with 1 ⅛ inch screws, four screws on each wing; then carry the soil-pipe out through the roof, and finish it off in the usual manner, and I believe that you have got a stack of soil-pipe which will stand for ages. One thing, let me remark, that a plumber should see to is that the carpenter cannot drive any nails into his soil-pipe, by making him use screws instead of nails. I will grant your correspondent that if soil-pipe with the soldered seam is used that I had rather use heavy iron pipe, but if drawn, or burned, soil-pipe is the kind used, I hold that lead soil-pipe is the best that can be found to-day upon the market. The settling of a building makes no difference as the whole thing goes together and does no harm; it cannot break lead soil-pipe which weighs ten pounds per lineal foot on a settlement of 1½ inches in fifty or sixty feet. The writer was, fortunately, the eye-witness of a terrible mess that the plumber got into in the city of Rochester, N. Y. By the specifications, the plumber was compelled to run his soil-pipe in solid brick walls, a length or two calked together, and then the masons built around it. The building settled, and the consequence was that every one of the stacks was broken, and the sight was anything but a pleasant one, even for me. I do not wish to have you think that I believe myself to be a wiseacre, but the article I read prompted me to say something in defense of my idea of what soil-pipe should be made. I know that it would be a difficult task to find enough journeymen of the present day to put up all the soil-pipe of the kind I recommend, but it is not an impossibility to seam. Any old-time plumber can teach the art of making four-inch or six-inch joints in a few hours; it is the dread of the size of the joint more than anything else, as, believe me, I would rather, to-day, make a four-inch upright than a three-quarter-inch upright joint.

In conclusion, let me add that I believe Mr. Whiteford is right when he recommends glass as the material of which to make water-closets, and I agree with him as regards the supply, in some cases, but not in all. I believe a cistern to be a superfluity at times, but, as is the case in New York city, and, as I am told, even in Chicago, you have a scant supply; then the cistern comes in play; but where you have a sufficient pressure of water, I fail to see the advantage. Some plumbers argue that a valve on the closet will leak; I have seen valves in cisterns leak just as badly as any I ever saw leak on a closet, and I have also seen cisterns over closets leak, which was very annoying to the occupants of the seat.

Hoping you will excuse this lengthy epistle, and wishing you and your excellent paper a very Happy New Year, I subscribe myself,

Yours very truly, H. C.

Cleveland, O., Jan. 1, 1884.

PROSPECTIVE SANITARY LEGISLATION IN MARYLAND.

To the Editor of The Sanitary News:—School hygiene is attracting the attention of sanitarians throughout the country, and I am glad to see The Sanitary News leading in the matter. The state board of health of Maryland will call the attention of the legislature to this vitally important subject. We will also ask that local boards of health shall have the sanitary supervision of all public institutions in their several districts. Yours very truly,

J. Robt. Ward,
President State Board of Health.

Govanstown, Md., January 1, 1884.

SICKNESS CAUSED BY EATING MEAT.

To the Editor of The Sanitary News:—Some time ago there was a large amount of illness in the prison at Wethersfield, Conn., in which there were at the time, about two hundred and fifty convicts, nearly one hundred of them being taken ill on the same day, before 10 o'clock at night. The meat served for dinner was mostly corned mutton or lamb. This was prepared at the market in Hartford, where it was customary to sell the better portions of the carcasses to the hotels and the more unsaleable portions were placed into brine, and when enough had accumulated for a meal, it was taken to the prison. There is every reason to believe that the meat was good when brought to the prison. It was boiled the day it was received and placed in the ice-house to cool, the day before it was eaten. It was packed *en masse*, instead of being spread out so as to cool rapidly. The meat was used for dinner. In about two hours the prisoners began to be taken with nausea, vomiting, vertigo, in some instances cramping of the legs, followed in most cases in a short time by violent purging. In a few cases the ejections from the stomach were green and watery, and all contained undigested food. In but one case was there an alarming failure of the pulse or any symptoms of marked depression or collapse. Those who did not eat the mutton were not attacked. The meat had no suspicious taste. One man who ate a double ration suffered accordingly. No case resulted fatally. It

was my belief at the time that some salt of zinc or copper had found its way into the meat. Specimens were boiled in a new tin basin for the purpose of testing the infusion for zinc or copper. The tin was badly corroded, which at first led Prof. Silliman to suspect some poison, not originating in decomposition. He afterward satisfied himself that no poison was maliciously introduced, but that the sickness was caused by an incipient putrescence of the meat. I am fully satisfied that his final conclusion is correct. Although I had fully expected to detect some metallic salt, I believe my failure was owing to the difficulty which exists when they are connected with organic substances, and that Prof. Silliman detected the cause of the illness. I am very truly yours,

A. S. WARNER, Warden.

Conn. State Prison, Wethersfield, Dec. 27, 1883.

CURRENT PUBLICATIONS.

WATER ANALYSIS.

The fact that a second edition of Macdonald's standard work on water analysis has been necessary, proves that its character is becoming better known and its usefulness more widely recognized. The plates are reinforced in the second edition by several new ones, and the text elaborated where advisable. It is an invaluable aid to the microscopic examination of water or air. The second edition is published by P. Blakiston, Son and Co., of Philadelphia.

HEALTH APHORISMS.

The terse sayings of Dr. Frank H. Hamilton, which are published under the above title by Bermingham & Co., of New York, form an admirable collection of hot hygienic shot which may be used by sanitarians in brief, or extended when desirable. The second portion of the book consists of a lecture on the struggle for life, which deals principally with the dangers arising from bad house drainage in cities.

PUBLICATIONS RECEIVED.

"Health Aphorisms and an Essay on The Struggle for Life Against Civilization, Luxury, and Æstheticism." By Frank H. Hamilton, A. M., M. D., LL. D. New York: Bermingham & Co. Pp. 64. 50 cents.

"Decision by the supreme court of New Jersey on the milk adulteration act."

"Dangers to Health: A Pictorial Guide to Domestic Sanitary Defects." By T. Pridgin Teale, M.A., Surgeon to the General Infirmary at Leeds. Fourth Edition. New York: D. Appleton & Co., Bond Street. 1883. Pp. 172. Chicago: S. A. Maxwell & Co., Wabash Avenue. $3.00.

"The Builder." London: December 8, 1883.

"Transactions of the New York Academy of Medicine." Second Series. Volume Three. 1883.

"Introductory Address delivered before the Medical Class of Dartmouth College, August 1, 1883." By Louis Elsberg, A.M., M. D.

"Annual Report of the Supervising Surgeon-General of the Marine Hospital Service of the United States for the fiscal year, 1883." Washington: Government Printing Office. 1883. Pp. 406.

"Regulations governing Plumbing, House Drainage, and the Ventilation of House Pipes and Sewers of the city of Baltimore, Md., for the information of the owners, contractors, and plumbers." 1883. Pp. 13.

"Annual Report of the National Board of Health for the fiscal year ending June 30, 1883." Washington, D. C.: Gibson Brothers, Printers. Pp. 102.

"Monckton's Practical Geometry. Being a series of lessons beginning with the simplest problems and in the course embracing all of geometry likely to be required for the use of every class of mechanics or that are needed for instruction in mechanical schools." Illustrated by forty-two full page plates. By James H. Monckton. New York: William T. Comstock. 1883. $1.00.

"Contributions from the Chemical Laboratory of the University of Michigan." Edited by Albert B. Prescott, M.D., F.C.S., and Victor C. Vaughan, M. D., Ph. D. Vol. I., Part II. Price 40 cents. Ann Arbor: Reprinted from the August number of the Physician and Surgeon, 1883. Pp. 104.

NOTES AND NEWS.

ANNOUNCEMENTS.

Jan. 15, at Indianapolis. Fourth Annual Meeting of Association of County Surveyors and Civil Engineers of Indiana.

Jan. 16, at New York. Thirty-first Annual Meeting of the American Society of Civil Engineers.

Jan. 22, in Manitoba. Meeting of each county council for the appointment of health officers.

Feb. 1, at Chicago. Opening of the Manual Training School.

Feb. 14 and 15, at Columbus, O. First meeting of the State Sanitary Association.

BUILDING ITEMS.

The Iowa state capital will be dedicated Jan. 17.

The plans of Architect E. E. Meyers, of Detroit, have been accepted for a $300,000 city hall at Richmond, Va.

The plans of E. O. Fallis & Co., of Toledo, O., for a court-house at Adrian, Mich., have been accepted.

The building inspectors of Detroit will soon bring test-cases relating to the supervision of elevators, etc.

The Tribune of Minneapolis is building a seven-story structure.

In Paris, ridges of all roofs in future buildings must be provided with a horizontal support 2¼ feet wide for the use of workmen and, in case of fire, to be bordered by railing on one side one foot high, and on the other, two feet and eight inches high with net-work. All partition-walls and walls perpendicular to façades must have iron ladders and hand-rails. Double staircases are to be in upper stories for easier escape in case of fire.

Architect J. H. Valentine has drawn plans for a five-story brick factory, twenty-five by one hundred feet, to be built on the northeast corner of Sixty-fourth street and Indiana avenue, New York city, for Henry C. Meyer.

The building operations of Jos. Miller & Sons, of Peoria, Ill., during the year 1883, amounted to $125,000.

H. H. Richardson, of Boston, and E. E. Myers, of Detroit, submitted plans for a $2,000,000 court-house at Pittsburgh, Penn.

ENGINEERING NOTES.

David H. Cole has been elected chief engineer of the Wilmington, Del., water-works.

The western society of civil engineers now has its headquarters in the American express building on Monroe street, Chicago.

COMMUNICABLE DISEASES.

Dr. William A. Chittick, of Detroit, Mich., has discovered the characteristic diphtheritic membrane in cats in a family where the disease prevailed.

Washington schools are closed on account of measles.

There were from forty-eight to fifty thousand deaths from cholera in Egypt during the last epidemic.

Scarlet fever in Camden, Ill., caused alarm and suspension of the schools.

The Mexican yellow fever relief committee in San Francisco raised $6,416.77, which will be invested in provisions and distributed in the towns on the west coast of Mexico which suffered from yellow fever.

"Malaria is a word which is doing much mischief."—*Dr. J. Robt. Ward.*

The Admiralty states that the sanitary condition of the English navy was never so bad as at present.

The death-rate of Brooklyn for 1883 was 22.16 per 1,000 population.

The annual death-rate of Detroit for 1883 was 22.26 per 1,000. There were 1,947 cases of sickness from diphtheria, scarlet fever and small-pox.

A death from trichinosis occurred Jan. 1 at Bloomington, Ill.

SEWERAGE.

A final attempt is to be made to clean San Francisco's wonderful Fifth street sewer with Johnson's flushing gates, providing the cost will not exceed $200.

Sioux City, Ia., will have sewerage.

Leavenworth, Kan., has a local war on account of her new sewers and the engineers.

The plan of drainage adopted by the city council of Ozark, Ark., has not proved successful. They recently cut ditches on both sides of Walnut street to the river. A late rain poured through the ditches and washed away the ground for a good distance on both sides. The council will fill up the ditches and let the water take its old course.

Prof. J. Koinig proposes to purify town sewage by allowing it to trickle over a net-work of wire, exposing a large surface to oxidization.

The new intercepting sewerage system of Boston was put in operation Jan. 1.

PLUMBING NOTES.

The inspector of plumbing in Baltimore has to be a practical plumber not engaged in business, and is to receive a salary of $1,200 per annum.

The largest class in the New York trades school is that of plumbers, who are given lectures on theoretical drainage and ventilation, and are taught to dress pipes, make joints, and fit up appliances.

The hospital for sick children, Great Ormond street, London, is closed to permit an overhauling of its drainage system.

The master plumbers of Kansas City have organized an association. The first meeting for permanent organization was held on the evening of Jan. 8.

BOARDS OF HEALTH.

Under a recent law, 850 local boards of health have organized in Wisconsin during the year past, of which about 450 have physicians as health officers.

Under an amendment of the law, the Wisconsin state board of health can publish no report this year.

PERSONALS.

Dr. H. R. Storer is the author of a new climatic paper on Newport as affected by the gulf stream.

Dr. C. W. Chancellor has issued a refutation of the criticisms of Col. Geo. E. Waring, jr., and Dr. John S. Billings, on his paper on the Liernur system of sewerage.

Dr. Iddings, health officer of Dayton, O., receives a monthly salary of $50.

In the present congress the committee on public health is composed of Messrs. Beach, Graves, Riggs, Candler, Fielder, Davis of Massachusetts, Evans of Pennsylvania, Libbey, and Pettibone. The committee on appropriations consists of Messrs. Randall, Forney, Ellis, Holman, Hancock, Townshend, Hutchins, Follet, Burnes, Keifer, Cannon, Ryan, Calkins, Horr, and Washburn.

The Duke of Buckingham is chairman of the executive council of the International health exhibition, to be held in London in 1884.

The Lick estate is to provide free baths in San Francisco, having given $150,000 for the purpose.

Jno. K. Allen, of Chicago, has been appointed a delegate from the American public health association to the international sanitary congress at The Hague, in 1884.

Surgeon-General Jno. B. Hamilton was in Chicago this month.

Dr. A. L. Gihon has been attached to the naval hospital at Washington.

Dr. A. F. Holt, health officer of Cambridge, has been appointed surgeon-general of Massachusetts.

Francis Elgar, naval architect of the city of London, has been unanimously elected to the chair of naval architecture in the university of Glasgow.

MISCELLANEOUS.

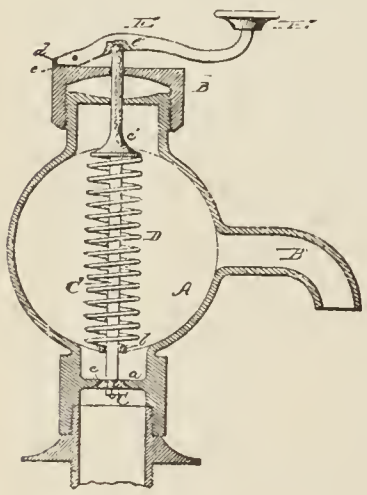
Washington has a cremation association.

The death-rate of Baltimore, for the week ending Dec. 29, as forwarded by A. R. Carter, secretary of the board of health, was 25.04 per 1,000.

SANITARY APPLIANCES.

[*Under this head* The Sanitary News *will publish, in each issue, a complete record of all the latest patents of sanitary appliances issued by the United States patent office. Cuts will be reproduced of such as seem to have special merit, or are of immediate interest, together with abstracts of the specifications. Single copies of printed specifications and drawings of any patent will be forwarded by* The Sanitary News *on receipt of twenty-five cents.*]

289,373. Faucet. William J. Barr and John L. Nelson, Chicago. Filed Dec. 28, 1882.



No. 289,373.

In this spring faucet the lever E is hinged to the shell and has a short extension in the rear of its pivotal point, adapted to fit squarely against the shell when the valve is closed, to prevent the lifting of the lever to disconnect the stem. The other features are self explanatory.

289,426. Ventilator. Michael A. W. Loomis, Washington, D. C. Filed June 8, 1883.

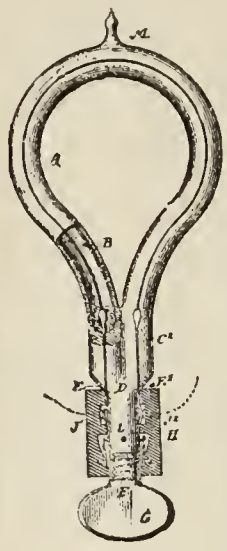
289,456. Incandescent Electric Lamp. Robert J. Sheehy, New York, N. Y. Filed Dec. 15, 1882.

This consists of a curved tube of glass, or other transparent material, and an illuminating conductor, or filament of carbon, traversing the axial line of the tube.

289,458. Sash-balance. Gary B. Smith, Denver, Colo., assignor to Robert E. Perry, same place. Filed June 19, 1883.

289,495. Water-Closet and Trap. Joseph Bennor, Philadelphia, Pa. Filed January 3, 1883.

This closet has a hopper, a receiver, and a trap sealed, with a loose, or disconnected, ball or valve, resting in an annular groove.



No. 289,456.

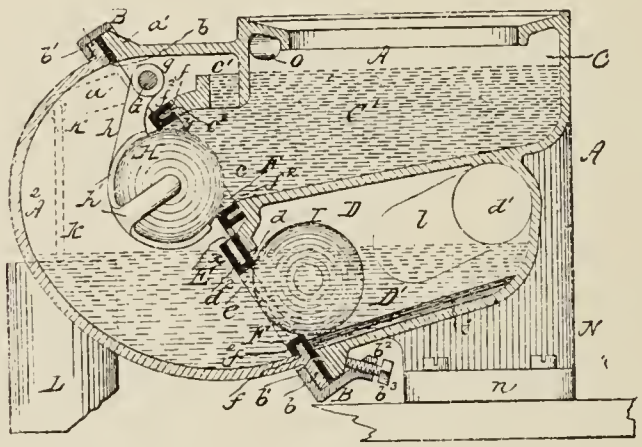
289,496. Wash-basin. Joseph Bennor, Philadelphia, Pa. Filed April 9, 1883.

The bowl A has a side opening or slot a′, outlet-pipe B, and extension C, having a chamber provided with a valve-seat c′, in which is the valve D. This valve is secured to the tube E, and is operated by the rod E^3, adapted to project into the bowl or basin. There is also the chamber F, having one or more openings ff, with removable caps f′, and apertures f^8, leading to the outlet pipe B. The trap-chamber G is provided with a valve H, opening i, and outlet h, contracted at h′.

289,537. Illuminating Sidewalk, or roof to a continuous vault or gallery, etc. Thaddeus Hyatt, New York, N. Y. Filed Nov. 7, 1883.

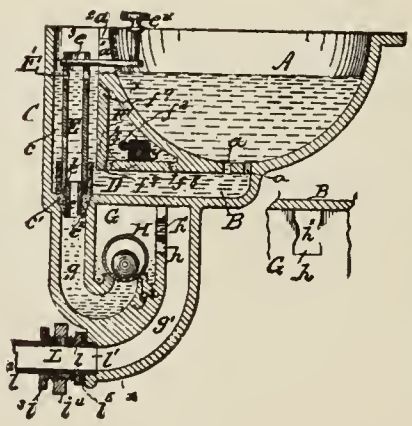
289,568. Fire Escape. John Schmittknecht, New York, N. Y. Filed Feb. 7, 1883.

289,570. Electric Lighting Apparatus. Nelson S. White, Canton, Mass. Filed Aug. 16, 1883.



No. 289,495.

286,601. Coupling for Faucets. Robert P. Barnstead, Boston, Mass. Filed July 30, 1883.



No. 289,496.

289,634. Furnace. Wilson Ernst, Camden, N. J. Filed July 16, 1883.

289,636. Chimney-cap. Benjamin J. Field, Babylon, N. Y. Filed June 11, 1883.

289,710. Self-acting Faucet. Anton Prier, Charles Doherty and Pierce E. Everett, Kansas City, Mo. Filed April 2, 1883.

289,730. Fire Escape. Charles W. Tillett, Fairview, O. Filed March 20, 1883.

289,744. Steam Pipe and Boiler Covering. LaFayette Aldrich, Milwaukee, Wis. Filed April 24, 1883.

The sanitary association of New Orleans recommends the contract system for cleaning the filthy gutters.

The European powers have accepted the invitation to meet in a sanitary convention at Rome.

Over one hundred persons have been vaccinated by Dr. Freire for yellow fever.

American pork can now be imported into France at three ports only,—Marseilles, Havre and Bordeaux.

Current Topics.

The sanitary problem of Alexandria, Egypt, is to be handled after British ideas, by Mr. Clifford Lloyd. Should the British make no greater success of the sanitary administration than they have of the Egyptian protectorate, we may expect cholera to be epidemic there again soon.

In a report upon a system of sewerage for Muskegon, Michigan, Major Geo. T. Clarke, city engineer, gives the circumstances under which the city is placed, as seeming to show that the separate system would prove more successful than the combined system. The extreme elevation above the terminal is forty-eight feet. The sandy soil is soaked and saturated with the accumulated nastiness of five thousand privy-pits. The absorbent power of the soil lessens the necessity for removing the storm water by artificial means. The wash from the graded streets, made as they are of sand and sawdust, would very soon fill a combined sewer with a mass difficult of removal. The slight fall, and the increased cost of the combined system are arguments against its construction in Muskegon. It is probable that Major Clarke's views will be adopted by the city.

The Sanitary News takes pleasure in calling especial attention to the series of articles which begin in this number upon the sanitary administration of foreign countries. The first country treated of is Sweden, and the article is from the pen of the distinguished Dr. Frederick Eklund, of Stockholm, whose well-known work has graced the literature of his own country as well as that of France, Germany and Italy. The Sanitary News takes much gratification in publishing his first contribution to English literature, and to his interesting resumé of the Swedish sanitary government; there is an added charm in his delightful construction of our usually prolix language. A hearty reception will be accorded Dr. Eklund's articles by the health officers of this country. Arrangements are consummated by which this series will include articles upon each of the systems of the principal foreign governments.

There is much "threshing of empty straw" in the conduct of study into the causation and spread of contagious diseases. Frequently a circular is issued by a state board of health or a state medical society to the members of the medical profession asking questions which are intended to secure information concerning some one or more of the contagious diseases. The nature of the questions partake largely of the belief of the promulgator, and are not usually framed in a perfectly impartial manner. The physician replies according to the best of his belief, and every physician has had many cases of disease in which he could not trace the cause, and where he could not say it did not arise *de novo*. It is, of course, an absurd doctrine that will argue that something may be produced from nothing. There is an exciting cause for all illness, but the cause cannot be determined from a batch of replies made from memory, by guess, or from partial knowledge. The tendency to circularize the profession, and by this means secure information upon which to base a scientific paper, should be superseded by a patient investigation with a microscope, or a chemist's crucible.

The sewerage and the water-supply of the city of Memphis have been written up and written down until there is but one point which has not been touched upon by adversary or friend. It is only with the idea of completing the picture that The Sanitary News makes an addition. The evils which are supposed to result to the human body by reason of drinking impure water have been many times depicted with sickening reality. It is not often, however, that an opportunity is presented of examining the exact condition of the human stomach after it has been required to assimilate a harmful substance for a period of years. The Sanitary News is in receipt of a well-executed sectional drawing of a human stomach which had tried for twelve years to assimilate Wolf river "third-best" water, which is the supply of the city of Memphis. It is not supposed that this graphic picture will be believed to represent the true state of the stomach, by those scientists who are skeptical save with evidence visible to their own eyes. However, The Sanitary News will reproduce the picture as best it can in words. The general ensemble of the picture is one of discouragement. The stomach has every appearance of having attempted to do its duty under adverse circumstances. Its countenance (if a stomach may be said to have a countenance) looks much like that of a dog who has met reverses. In the bottom, lying uneasily upon the corrugated surface of the stomach, is a stratum of coarse sand and gravel which has every appearance of having belonged to a water-bearing deposit. The next layer is a collection of solidified tadpoles and embryonic frogs, apparently well satisfied to lie semi-dormant in a temperature of 98½ degrees Fahrenheit. The succeeding deposit is one of fine sand, which may be recognized as having come down during high water, from the interior of Shelby county, with a view to getting in with some waste-water friend on its way to the Mississippi river by rolling gaily through the sewer system and pumping-works. It has the appearance of being annoyed by the unintentional error of getting into a Memphian stomach, the flushing process of which cannot compare with that of the sewer system. Upon this rest layers of magnesia, ammonia, soft mud, vegetable matter, and finally a deposit of coal tar. This deposit on the one side lies level with the pyloric orifice. The small portion of the stomach remaining unoccupied is the only place where imperfect digestion of food can be carried on, and even this is interfered with by mud stalactites suspended from the fringed edge of the epithelial lining at the esophagean opening. Taken as a whole, it is a stomach, the owner of which might have been troubled with emotional insanity.

The results of misdirected effort are fully as disastrous in sanitary fields as elsewhere. Labor expended in a fruitless, because barren, field is practically wasted. Labor employed in gathering facts which are never utilized is an injustice to the facts as well as to the persons furnishing them. Labor employed in collecting data which are compiled shabbily, and, because of this, present contorted facts, too weak to make a statement upon, is a criminal use of the intellect with which man, more than any other animal, is endowed.

Good health is rarely appreciated until once lost.

There is a suggestion in the communication of Mr. Thomas G. Neski, of Cincinnati, which may be found on an-

other page of this issue, which may prove to be of interest to other associations of master plumbers. The Cincinnati association desires to secure the passage of a law by the legislature of Ohio regulating the practice of plumbing in the city of Cincinnati. To aid them in securing this law, the association has invited the local chapter of the American institute of architects and the two medical societies of the city to coöperate with them. This invitation ought to be accepted by the architects and the physicians. To the architect, a profession of plumbers with the incompetent and dishonest weeded out by a vigorous law, would prove a great assistance in securing houses which would be as habitable as they were artistic. To the physician, the removal of putty joints, "seconds" in pipes, etc., would remove several factors in the causation of illness which would, by the law of exclusion, render diagnosis easier and prognosis more favorable. The associations of Chicago and Baltimore already coöperate with the health departments, and find it advantageous to do so. Cannot the coöperation be extended in the direction pointed out by Mr. Neski?

There seems to be good reason to hope for favorable action by congress in the matter of appropriations for the national board of health. The friends of the board can forward this action very much by making their friendship known to their representatives and senators in congress. If there is any argument why the national board of health should be continued (and there are many) it should be communicated to the men, who can, in a moment, destroy all hope of national health legislation, or can place it upon a sure and independent basis. It is not fair to say that congress will intentionally neglect to supply funds to a branch of the government when it really needs it. It is not caprice or malice that guides adverse legislation, so much as ignorance concerning the questions at issue. If there has any good resulted from the work of the national board of health, and most assuredly there has, those interested should communicate the fact to their representatives.

There is not, probably, a member of congress to-day who would hold up to scorn either of the governments of France, Germany or Russia, because they sent sanitary commissions to Egypt to study the conditions under which cholera could be communicated from one person or country to another. And yet, when the national board of health of this country was engaged in studying the contagiousness of diphtheria (a disease which killed, last year, as many people in this country as cholera did in Egypt) the principal enemy of the board defeated legislation by a speech conceived in ignorance and born in prejudice. The same thing should not happen again.

A very striking fact is noticed in examining the patent office *Gazette*, or any of the published lists of patents granted. It is the large number of patents which are granted for fire-escapes. The fact that inventive minds are so largely engaged in devising methods of saving life would speak well for the humane spirit of Americans, were the same men as anxious to devise and execute measures for saving life under other circumstances. But they are not. They will permit a contagious disease, such as diphtheria or scarlet fever, to ravage a town and remove, by a death touchingly sad—because of the youthful, budding promise of the young victim—more children in one week than perish by fire in years, and never raise a helping hand or warning voice to prevent communication or destroy the cause of the disease. It is not to make fire-escapes any less in quantity, but to make other death-escapes more numerous that these words are offered.

The first meeting of the Ohio state sanitary association will be held in the board of trade room, at Columbus, on February 14 and 15. Papers on various sanitary subjects will be presented, but the principal effort will be to show that a state board of health is needed in Ohio.

Some time ago Mr. John Honeyman, of Glasgow, read a paper in which he showed some of the advantages of low ceilings in tenement-houses. His argument was misunderstood and he was credited with advocating low ceilings in all cases. In a recent article he has defended and explained his first paper. Under the building regulations, tenements in Glasgow cannot be more than forty feet high, and each room must be ten feet high, thus limiting the number of stories to three. The Sanitary News agrees with Mr. Honeyman in his statement that, if the open space around the tenement is kept free from obstructions, "it is of no consequence whatever, whether your tenement is seven or only two stories high." Mr. Honeyman's plan of making stories eight feet high would give four stories under the building restrictions, and, as he states, the rooms eight feet high could be easier heated and better lighted than rooms ten feet high. In his last article he compares a tenement under the regulations, and one under his plan of construction, in which comparison he takes a plat of ground two hundred and fifty feet by one hundred and fifty feet, longest way east and west, bounded by streets fifty feet wide. On this ground he would place three blocks of dwellings running north and south, with a space of fifty-seven feet between each. He would build five stories, eight feet high, with twelve dwellings on each floor, or one hundred and eighty dwellings on the property. The same ground, under the present restrictions, must be divided by a lane running east and west, and the number of tenements would be limited to one hundred and twenty with smaller rooms. This represents a large financial difference in the returns from the property. There is another argument which is sometimes brought to bear against high buildings in America,—the danger of loss of life in case of fire. That this is not a weighty argument, save where a building is constructed without any regard to escape in such an emergency, will be conceded by nearly all. With an adequate provision, it is as easy to escape from a high building as a low one, and with the improved apparatus employed by our fire department, loss of life in new buildings in cities is quite rare. By no means does it follow that there is great danger to life when a building burns, because it is very high, rather than moderately so, or even low.

The international congress meets in its fifth session at The Hague, from the twenty-first to the twenty-seventh of next August. There have been four sections arranged, of which section one will discuss general and international hygiene, and the prophylaxis of infectious and contagious diseases; the second section will treat of the hygiene of

cities, including sewerage, streets and pavements, water-supply, public buildings, hospitals, prisons, drainage, irrigation, means of transportation, burial, cremation, etc.; the third section will discuss personal hygiene, climate, food, clothing, habitations, education, and infants. The fourth section will touch on professional hygiene, social economy, naval and military hygiene, etc.

The suggestion made by Dr. Oscar C. DeWolf, commissioner of health of this city, to the master plumbers' association that they become incorporated under the state law, has been already put into effect, and the association is incorporated, — the first to take the step in this country. The advantages gained are apparent, but this action is only preliminary to that which, it is expected, will lead to greater benefits to the plumbing craft. Nothing is more emphatically needed, at present, than some legalized system of examination of plumbers before they are licensed. It is the opinion of The Sanitary News that there should be some means for educating those who desire to become plumbers other than in the hard and unsatisfactory school of mere practice; but, in any event, some qualified authority should have the power to say whether the preparation is complete, when a plumber sets himself up as a master. A board of competent examiners could, naturally, be found nowhere so well as in an incorporated master plumbers' association, which could be held legally responsible for its acts. The suggestion of incorporation has attracted considerable attention among the readers of The Sanitary News, and some of the communications sent in on this subject are published in another column.

In response to the request of many readers of The Sanitary News, there will be begun in the next issue of the paper a series of articles on the sanitary condition of the schools of Chicago. It is well known that, as a rule, our schools are in far better condition than the schools of New York or Philadelphia. It is a fact, too, that some of the older buildings are in a wretched condition, while the ventilation of some of them has been improved by constructing flues, etc. The exact condition of the schools will be given, and, where improvements have been made, the means employed will be illustrated. The series will prove of especial interest to all persons engaged in the schools of the city, as well as to all those interested in school hygiene. It will be conducted in a scientific and impartial manner, and The Sanitary News is confident that its efforts in this, as in all other directions, will be appreciated and warrant the necessary outlay.

The question for owners and projectors of buildings to decide is not, whether systems of ventilation are theoretically correct, but whether the proposed system of ventilation will really ventilate under the circumstances in which it is to be placed. The Sanitary News has often stated that correct and efficient ventilation could not be had without expense. Is the increased, or, perhaps, more correctly speaking, the maintained health of the pupils in a school containing nearly one thousand, worth the money spent to accomplish the end? This is a question which the patrons of the schools, who pay the taxes, would answer in the affirmative. It is a question which the board of education of Chicago seem inclined to answer in the negative. They desire a cheaper system of ventilation, and because the school-houses erected after the designs and under the superintendence of Mr. James R. Willett, the present architect of the board, require about one ton more of coal each day to heat and ventilate than they would like, they are inclined to find fault and urge a cheaper system, or, perhaps, a less amount of ventilation. The board of education should remember that the day when Chicago will be content to have her school-houses unventilated, because of a few dollars expense, has passed by. The teachers and some of the scholars know what it is to be domiciled in a clean, light and airy building, like the Keith school, and the parents of the children probably know how the general tone of the children has improved because of having better air to breathe and more of it. The Sanitary News knows, from actual observation, that it is not safe to construct a school-building without supplying fully as much air as is supplied by Mr. Willett's system of ventilation in the Keith school. It also knows that the same amount of ventilation cannot be maintained by any other system any cheaper than is now accomplished in the Keith school. The board of education has had many words of commendation from The Sanitary News for their past efforts to improve the sanitary condition of the schools. It is sincerely hoped that the commendation will not be turned to condemnation.

A bill entitled "an act to prevent the introduction of infectious and contagious diseases into the United States, and to establish a national board of health," has been introduced into the house of representatives by Mr. Young, of Tennessee. It has passed its second reading and been referred to the committee on public health.

The board of health of New York city do not seem to be afraid that any serious results will follow from the fatal case of yellow fever which occurred on Perry street on January 13. If the case had been in New Orleans instead of New York, and the government quarantine and the board of health had paid no more attention to the case than did the authorities in New York, the country would be crying aloud with fear and indignation. As it is, to draw it as mildly as it deserves, they have been guilty of criminal neglect and carelessness.

Some months since a committee of medical men was appointed to investigate Dr. Domingo Freire's preventive vaccination with attenuated cultures of the yellow fever microbe. This committee has now resigned because the members objected to a statement claimed to have been made by him, that they recognized the harmlessness of the vaccination, they claiming that they have expressed no opinion on that point. About two hundred persons have undergone vaccination at the hands of Dr. Friere, and have suffered no more inconvenience than usually follows vaccination against small-pox.

The board of health of Louisiana has finally won its case in the supreme court against a steamship company, which had for many years refused to pay quarantine fees. The court holds that such fees are compensation for services rendered and not taxes. Over $50,000 will be paid into the treasury of the board under this decision.

CHICAGO SEWERAGE—SPECIFICATIONS FOR CONSTRUCTION.—XIX.

MAN-HOLES.

All man-holes are now built circular in section. For some reason, not well founded, it would seem, a few were originally made oval in shape. This led to annoying confusion and delay; whenever a report of a broken cover came to the office of the sewer department and had to be replaced, it was necessary to look up the record of the construction of the particular man-hole in question to learn what kind of a cover to send out. The oval shape has been discontinued. All man-holes are three feet in internal diameter. They are built with two rings of brick, thus giving a thickness of eight inches to the wall. The bricks in the inside ring are set vertically. The outer ring is built of "bats," so far as the broken brick will go; otherwise, whole bricks are used, set as in the inside ring and breaking joints with it. Up to the time when iron covers were first used the walls of the man-holes were only one brick in thickness. Such man-holes, still in existence and on main streets, where there is the heaviest traffic, seem to have all the strength required of them; as a matter of precaution, now that the iron covers are largely used, the walls are made of double thickness. The top course of bricks, in all cases, consists of whole

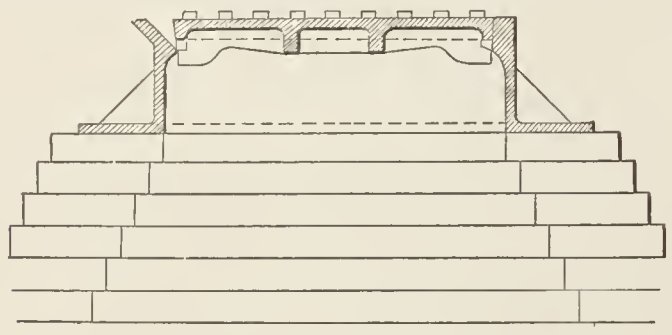


Fig 1.—Man-hole cover, side view.

bricks, laid as leaders. When the sewers are less than three feet in diameter the man-holes are built with solid foundations of brick, begun twelve inches below the grade of the sewers.

On unpaved streets (they are still numerous in Chicago) the tops of the man-hole covers are placed four inches lower than the surface of the streets; on paved streets, one inch lower. Where wooden covers are to be set the top of the man-hole is two feet and eight inches in diameter, the walls being drawn in by two header courses, decreasing the diameter two inches for each course; but where iron covers are set the top is two feet in diameter, the walls being drawn in by means of twelve header courses laid horizontally, decreasing the diameter one inch for each course. The construction of the upper part of a man-hole, with iron cover and support in place, is shown in the accompanying diagram—Fig. 1. This is the closed cover with small projections affording a foothold for horses. Fig. 2 shows the same cover looked at from above. Man-holes are placed at all intersections, and the distances at which they are placed between intersections are governed by the sizes of the sewers. Over pipe sewers—two to two and one-half feet in diameter—they are not allowed to be more than 140 feet apart, and usually not less than 100 feet; over three-foot sewers, the limit is 165 feet, and over those from three and one-half feet in diameter upward, 300 feet. Access to the sewers is effected, through the man-holes, by the use of short and light ladders which the workmen carry with them.

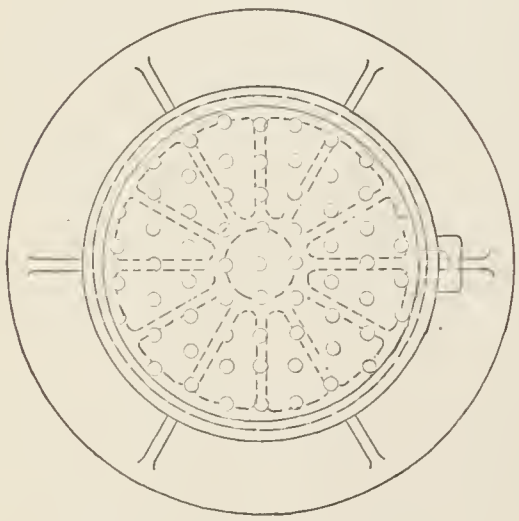


Fig. 2.—Man-hole cover, top view.

EXCAVATION.

By the specifications under which the sewers of Chicago are constructed, the trenches are excavated in such directions as required (in the middle of the street), and to the depths necessary to secure the proper grades. In wet trenches that require to be sheeted, and where provision is to be made to keep the sewers dry during their construction, the widths of the trenches for the brick sewers inside the sheeting are three feet greater than the outside diameter of the sewers. For twelve and fifteen-inch pipe sewers, sheeted trenches are not less than five feet in width. In dry trenches, where no provision is made to protect the work from water, and that do not have to be sheeted, the width of the trenches is such as to permit of the construction of the work in the manner and size as specified. Wherever the nature of the ground admits, the bottom of the excavation has the shape and dimensions of the outside of the lower half of the sewer. In order to secure this, the contractor is required to provide a pattern or form, made with two segments, one to fit the outside and the other the inside of the invert. This is firmly and securely set to the proper grade, by the stake given by the engineer, and remains unmoved in its position until after the masonry is laid. The bed for the sewers is then brought to the required shape, by trimming, with suitable tools, to a line stretched from the outside of the masonry to the form.

The material excavated is deposited on the side of the trenches, beyond the reach of slides. The banks are kept trimmed up, so as to be of as little inconvenience as possible to the public travel, or to tenants occupying adjoining property. In case the street is not wide enough to furnish room for deposit without obstructing the sidewalk, the contractor is required to erect and maintain, in front of all buildings, a suitable barrier, to keep the earth off at least three feet of the inner portion of the walk.

All water, gas, or other kinds of pipes, are carefully supported and protected from injury by the contractor, either until the sewer is built and the back filling finished, or, if necessary, until the proper officers remove or change them.

All paving, graveling, macadamizing, planking, sidewalks, culverts and cross-walks, or any street paving or walks whatever, are carefully removed before the excavation is made, and kept separate from other excavated material.

Where rock is encountered in excavating the trenches, it is removed by drilling and blasting, or otherwise, to the surface of the outside of the bottom of the sewer. Whenever a main water or gas pipe crosses the line of the trench, the rock on each side of the pipe, for a distance of five feet, is removed without blasting. Where blasts are being made, the trench is carefully covered with suitable brush or timber, to prevent danger to life and property.

SANITARY ADMINISTRATION IN FOREIGN COUNTRIES—SWEDEN—I.

BY DR. FREDERICK EKLUND, STOCKHOLM.

It is to the ecclesiastical department of the administration of the royal Swedish government that belongs the medical body, the care of the public health and all things relating to persons, authorities and establishments. The most important central office is named the "Medical Direction," but was formerly the college, or the board of health, which, in conformity with the gracious instruction of His Royal Majesty, dated December 2, 1877, consists of a president, named director-general, and four members, viz., three with the denomination of medical counselors, who manage civil business, and one, named surgeon-colonel, whose duty is to care for the health of the royal army and navy. The director-general and the members of the medical direction shall be legitimate physicians, that is, licentiates of medicine. The direction is collective, as well in the consultations as in the conclusions.

Upon the medical direction is incumbent the chief inspection and the administration of all that concerns the sanitary state of affairs and the care of the sick among the inhabitants of the kingdom generally, and of the land and naval army in time of peace, and of war especially. For this purpose it manages business, relative to

(a) The public health and the care of the sick and general sanitary questions, which, so far as is practiced by the boards of health and the communal committees and by the provincial, district and town physicians, belong to the management of one of the medical counselors.

(b) Hospitals, lazar-houses, and infirmaries for venereal diseases.

(c) Medico-legal opinions and protocols over medico-legal examinations; b and c belong to the management of another medical counselor.

(d) The pharmacology and the apothecaries' shops.

(e) The midwives.

(f) The vaccination and the efforts made for its advancement.

(g) The mineral-waters and the bathing establishments; d, e, f and g, belong to the management of a third medical counselor.

(h) The care of the health and of the sick of the army and of the navy.

(i) The veterinary art.

(k) The exercise of the art of the dentists and of the minor surgeons; h, i and k, are managed and directed by the surgeon-colonel, who is at the office of the surgeon-lieutenant-colonel, where he has in charge the medicinal stores, which are the property of the crown. He manages affairs belonging to the said counting-house, and is aided in his care and oversight of the dependencies of the office by the attorney and public accuser, and, besides this, has the control over the medicinal stores which appertain to the regiments, the corps, the castles and the commandments.

The medical direction further exercises superintendence over all who practice medicine, the veterinary art, pharmacology, the trade of the dentist, minor surgery and midwifery. These are obliged to comply with all that the direction prescribes by virtue of valid regulations and instructions, with the exception of the teachers of the medical and veterinary pulpits and the physicians who are appointed to the lazar-house of the Seraphim.

The medical direction must, on the request of colleges, tribunals and other public and communal authorities and persons in office, give counsel, information and opinions, especially in legal cases, in which enter medical and surgical queries, and give them all the assistance that is in its power. To perform its duties with respect to the inspection of the public health, and the care of the sick the medical direction is obliged to carry out the following line of work: In special cases demanded from authorities or physicians presenting accounts or reports, or in consequence of information gained otherwise, generally, or specifically, of the existence of epidemic diseases, it must communicate necessary counsel, directions, advice and prescriptions. It must devote attention to the disadvantageous influences, that effect increased sickness in some trades or in some professions, or other conditions, and also to propose, most humbly, the regulations or means, which may be suitable for the prevention of them. It must see that the physicians, who are charged with the inspection of the public health and for the care of the sick, justly perform their duties. When the negligence of the sanitary or communal committee to comply with the rules legally imposed upon them in respect to the care of the health and of the sick, comes to the knowledge of the medical direction, it must announce this for correction by the commanders of His Royal Majesty. At the time of a reported severe epidemic disease or great sickness, it must appoint extra physicians to assist in the care of the sick. In special cases, in which it is important that information with respect to the sanitary condition and the morbidity among men or domestic animals should be gathered directly in the locality, it must delegate a competent person to go to the place in question for the above-mentioned purpose and to report on the state of affairs after examination. It must submit projects for general measures for the public, which may serve to improve the general health, but which measures the direction itself is incompetent to take. The medical direction, moreover, takes care, that, in time of war, or in case of special appointments, as well at sea as on land, the same as at the breaking out of an epidemic disease, there may be the necessary supply of physicians and of medicines.

ADULTERATED MILK.

A prosecution against three persons for the sale of adulterated milk in New Jersey resulted in conviction before a justice of the peace. The adulterators appealed to the supreme court on the ground that the law was unconstitutional; (1) as it embraces two objects instead of but one; (2) it provides for the arbitrary divestiture of the property of the citizen without due process of law; (3) it is a judicial act deciding upon the character and admissibility of testimony; and (4) it adjudges a forfeiture of the rights and property of the citizen without a trial, without a judicial hearing, and judgment without a trial by jury. On all these objections the court decided that the law was constitutional. This decision marks an important advancement for the future of the milk commerce of New Jersey. Now that the state milk inspector has a law behind him which has stood the ordeal of a supreme court, his official acts will be more respected by the milk dealers.

THE SEWERAGE OF NAHANT—III.

BY E. W. BOWDITCH, C. E., BOSTON.

There being no public water during the season of 1882, most of the old wells and cisterns were of necessity depended upon for the major part of the drinking and cooking water, although many of the summer residents had spring water delivered periodically.

Of the wells and cisterns examined, nearly sixty per cent contained water that was classed as undesirable, the proportion of wells and cisterns being about even.

Concisely speaking, there were eighty cases of typhoid fever during 1881, out of an estimated population of 1,500. In 1882 the summer population was probably not over 1,200, and the number of cases can perhaps be best reported in the language of the local board of health, just issued: "It is a source of gratification and pleasure to them (the board) to be able to report that, notwithstanding the epidemic of typhoid fever that prevailed here in 1881, yet the vigorous correctionary measures adopted by the town, and carefully carried out, completely checked it, and not a single case of the fever has appeared here since, that could not be traced to some other locality for its origin."

Another statement should be taken into consideration here, which may not be apparent to all, at first sight, but that has an important bearing; naturally, some of the houses where typhoid was present in 1881 were vacant during 1882, so that to understand the condition precisely, and compare them, those houses that were vacant in 1882 in which cases occurred during 1881 should be omitted. Instead of eighty cases, therefore, the total number of patients in 1881 should be considered as sixty-one, sick in houses occupied either a portion or the whole of the season of 1882.

Six instances are shown below, three cisterns and three wells, all of which when first examined contained water that was undesirable to use.

Later, when such pumping and scrubbing out as was possible had been thoroughly attended to, fresh analyses were made, as indicated, and the waters were freely used during the season of 1882.

These samples have been selected, from many such, as showing, perhaps more markedly than any others, how it is sometimes possible for polluted water-supplies to recover, appreciably, in a short time, when the sources of pollution are removed.

Numbers of wells and cisterns did not recover, or show any marked signs of improvement that could be detected chemically, and though there are not enough examples on the whole list that occur in the same soil, and under sufficiently similar conditions, from which to draw general conclusions that can be considered as of very great value, yet it seems as if there was quite enough evidence to show that where isolated cases of typhoid occur that seem directly traceable to the drinking water, it is at times possible that the supply may be so improved by simple pumping out and cleaning as to become permissible in quality, and it is fair to infer from knowledge at hand that such pumping and cleaning may actually accomplish more than can be shown by any chemical work, as now done. Unless this last be true, or partially so, it appears scarcely possible that the condition of affairs at Nahant could have improved to such an extent in one season, one during which typhoid fever seemed more than usually prevalent elsewhere.

The first case is that of a well, the water from which is used in a house where fever was present in 1881. Sample taken in December, 1881:

A.

Free ammonia	0.0008
Albuminoid ammonia	0 0070
Chlorine	22.60
Fixed residue	72.30
Volatile "	17.70
Total "	90.00
Hardness	18°

The same well during the last of June, 1882, was as follows:

B.

Free ammonia	0.0027
Albuminoid ammonia	0.0082
Chlorine	10.60
Fixed residue	41.70
Volatile "	9.70
Total "	51.40
Hardness	13°

Of sample A the chemist reports: "A very suspicious water, on account of the large amount of chlorine, residue, nitrates, and high degree of hardness, although the soil appears at the present time to be acting as an efficient filter and oxidizer."

Of B the report is: "Suspicious on account of the large amount of nitrates, chlorine, residue and hardness. The small amount of the ammonias shows that the organic matter is at present being oxidized in passing through the soil."

The second case is that of a well in gravelly soil; water used in 1881 where there was fever in the house. Sample taken June, 1882:

C.

Free ammonia	0.0086
Albuminoid ammonia	0.0202
Chlorine	6.50
Fixed residue	19.80
Volatile "	4.40
Total "	24.20
Hardness	2½°

After cleaning, a sample was taken early in July:

D.

Free ammonia	0.0008
Albuminoid ammonia	0.0138
Chlorine	8.70
Fixed residue	21.40
Volatile "	2.10
Total "	23.50
Hardness	4°

A second cleaning was ordered, and a third sample taken the 1st of September:

E.

Free ammonia	0.0005
Albuminoid ammonia	0.0100
Chlorine	5 90
Fixed residue	19.40
Volatile "	3.40
Total "	22.80
Hardness	5°

Of C the report is: "There is too large an amount of organic matter present, as shown by the amount of both ammonias, the brown color and charring of the residue on ignition."

D is pronounced "a fair water, the albuminoid ammonia being just within the maximum normal; the yellowish tinge and the blackening of the residue upon ignition show rather too much vegetable matter."

When it comes to E, "There is no evidence of injurious contamination, and there is no reason for suspicion as to the future purity."

The third case of a well recovering (if this be the proper term to use) is one not over twenty feet deep and in a running gravel. Supposed source of defilement had existed not less than ten years. First sample taken in November, 1881.

F.

Free ammonia	0.0040
Albuminoid ammonia	0.0185
Chlorine	5.40
Fixed residue	10.50
Volatile "	6.00
Total "	16.50
Hardness	—

The 1st of February, 1882:

G.

Free ammonia	0.0019
Albuminoid ammonia	0.0074
Chlorine	5.70
Fixed residue	14.70
Volatile "	2.90
Total "	17.60
Hardness	2°

Early in April, 1882:

H.

Free ammonia	0.0005
Albuminoid ammonia	0.0078
Chlorine	4.90
Fixed residue	10.90
Volatile "	2.70
Total "	13.60
Hardness	1½°

In July the same water was:

I.

Free ammonia	0.0000
Albuminoid ammonia	0.0008
Chlorine	6.60
Fixed residue	28.90
Volatile "	11.30
Total "	38.20
Hardness	4°

Early in October (after heavy rains):

	J.
Free ammonia	0.0038
Albuminoid ammonia	0.0098
Chlorine	5 80
Fixed residue	12.50
Volatile "	5 00
Total "	17.50
Hardness	3°

F is pronounced "unfit for use."

G: "I cannot tell whether this is a cistern or well-water. If a well-water, it is very soft and good, for Nahant water. If a cistern water it contains too much chlorine and solid matter."

H: "A very good water."

I: "An excellent water at the present time. The trace of nitrates, however, together with the considerable amount of residue, gives rise to a slight suspicion as to future purity."

J: "Still an excellent water."

This example is perhaps the most striking of the entire list, there being such a number of analyses. It is worthy of mention that after the first clearing out (after F and before G) nothing was done save to pump considerable quantities of water for use on the place, and so far as possible draw considerable volumes of water whenever opportunity afforded.

MALARIA—II.

BY THOMAS W. HARVEY, M. D., ORANGE, N. J.

Another factor in this problem is the fact that this stream drains the populous little town of Orange; that it receives the wastings from the Telford roads, and that twenty hat shops pour into it their dye stuffs, waste and refuse; that it receives the contents of many house drains, and that connected with it until recently were many cesspools and vaults. From these sources we have an abundant supply of vegetable and animal substances to be carried down to the mill-ponds below, to be deposited on their bottoms and banks to undergo decomposition and to infect the subsoil water in the neighborhoods and thence the wells. Despite these conditions I have been unable to discover any diseases other than malarial that prevail here. Typhoid fever has been very exceptional, in fact there has been very little in Orange for these last three years. The eruptive fevers have been less prevalent than in other parts of the towns. Consumption is not as common as in other parts where its relation to dampness can be traced, and where malarial diseases are not prevalent. But in this small valley, lying between Orange and Bloomfield, along this brook, to my personal knowledge, almost every house has had one or more cases of malarial disease of some form during the last five years. In many houses case after case follows every season; as one family disgusted moves out another moves in, and one member of the family after another falls sick, and this has been repeated year after year.

This condition has been recognized and the cause sought. Many attribute it to the presence of the large artificial iee-pond, which, having little or no circulation every summer, is covered more or less with the green scum denoting the various forms of vegetable growth common to sueh ponds. The water has been examined by the state board of health and pronounced unsuitable for use. But the pond was allowed to run off this last summer, and yet fever and ague prevailed again this year.

There are other parts of the towns similarly situated as to level, but these parts have no mill-dams and no obstruction to the flow of the ground water, and they present few if any cases of genuine malarial disease. If we follow the brook in its course through Bloomfield and Bellville to the Passaic we will find numerous mill-dams, and all of these are reputed to be the centers of malarial influences to such an extent as to affect the sale of property. I may say here that the forms of malarial poisoning exhibited are rarely severe, and almost never fatal, yet they are serious enough to affeet the working capacity of the community and to reduce the wage gaining power of the individual to a degree worthy the regard of the public economist.

A few observations that I have made, and the more extensive observations of others, will form the basis of the following propositions which I offer for your consideration:

First, That the prevalence of malarial diseases is in direct ratio to the rate of flow of the ground water, and that where that flow is impeded the conditions favorable for the production of malaria will be found.

Second. That this malaria may be received into the system by other avenues than the lungs, and that it may affect the animal economy through the agency of drinking-water.

The first proposition I have already spoken of as fully as I care to, merely pointing to the relation that it bears to the second, namely, that shallow wells supplied from a saturated sub-soil may be active agents in the distribution of the poison.

The second proposition is advanced not as entirely new and startling, but as one not sufficiently considered by sanitarians, either as physicians or engineers. It is true that the evils of drinking surface water have been repeated until now we find few who will not acknowledge them, yet these dangers are considered to be those of infection by the overflow from vaults and refuse piles.

The older writers fully recognized this relation between drinking-water and malaria, but most of the modern writers who have noticed it have either contradicted the fact or have explained it in other ways. Undoubtedly the etymology of the word malaria has had some influence in causing such a relation to be overlooked, but not being necessarily bad air it may be received by other organs than the lungs.

All authorities seem to agree that water will absorb the poison, but there is no evidence that it will destroy it.

In presenting my own share of observations, I must acknowledge their meagerness, and yet they represent the reasons of a change of my own opinions, which has been confirmed by reading the observations of others.

I will repeat, then, that in this small area where we find as conditions a saturated sub-soil and other recognized factors for the production of malaria, where the use of shallow wells is almost universal, and where we find the surrounding, better-drained localities free from disease, here, I say, we will find that ninety per cent of the families are afflicted with effects of malaria.

One of the exceptions Mr. H., an intelligent New York lawyer, told me, that while he used the well on his place his family were always sick with the chills. Since using cistern water for the last three years they have been entirely free from the disease. This case is similar to one reported to the *Medical and Surgical Reporter* from Virginia, where in a certain valley where intermittents prevailed it was noticed that the old settlers who used the wells were the victims, and the new-comers who used water supplied from cisterns escaped.

The use of cistern water is not at all prevalent in Orange, nor can I find another family who use it for drinking-water in the district we are studying. This is the only family that I am sure has escaped fever and ague during my observations.

Another family were the victims of the disease every year for certainly three years. During the last eighteen months, though visited by other diseases, they have had no ague in the house. During this period they have ceased to use their old shallow well, and use a driven well some sixty feet deep, entering the rock about thirty feet. This has been the longest time that they have ever been free from the disease.

At the lowest point of the road where it crosses the brook there are several houses where these diseases are never absent, except occasionally in the depths of winter. Seven families take their drinking-water from a shallow well situated but thirty feet from the brook. The house that is constantly supplied from this well is never free from the disease. Family after family occupy it, and in every instance every person will have the ehills. People move to it who have never had the ague, and who perhaps have lived in this neighborhood and escaped hitherto, and soon they will be down with the disease They will move half a mile away and never have any more of it.

These are not proofs, you will say; they might receive the disease through the lungs nevertheless. I simply advance them to attract your attention to the subjeet. Other observers have brought forward more certain evidences. Among the older examples we may mention, besides the classical and well-known example of the troop-ship Argo, certain observations of the English army surgeons in the early part of the century.

In Spain, in 1809, the army were encamped for one night in a ravine; they drank the water from shallow wells in the neighborhood, and the next morning there were many soldiers on the sick list with ague. In another locality the streams had dried up, leaving isolated pools. The water from these when partaken of freely caused intermittents.

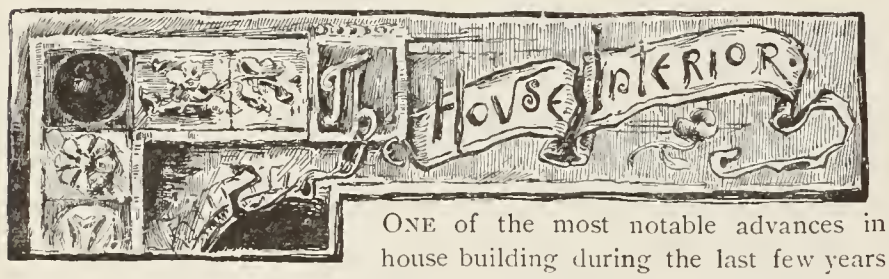
Again, in Holland, in 1794, the army were encamped on a hot, dry plain and used water from shallow wells. The use of this water was followed by fever and ague.

At Versailles, in 1845, Dr. and Mrs. Evans and a cavalry regiment, the ordinary supply failing, were compelled to get their drinking-water from pools receiving the surface drainage of the neighborhood. All who drank this water had intermittents, and many died, while the natives who would not drink the water escaped.

In the *American Journal of Medical Sciences* for January, 1878, Dr. Smart, of the United States army, recorded his observations on mountain fever, which he considers a true malarial fever, and he traces the outbreak of the disease at Fort Bridger, in 1873, to the drinking of water from the streams swollen with the melted snows of the mountains. This water was found at this season with a very high percentage of vegetable organic matter, as were also the snows of the mountains. He argues that the poison was wafted to the mountains with the much more ponderable particles of vegetable organic matter by winds, precipitated by the snow-storms and brought down to the post by the streams. He further records the fact that mountain fever disappears where good water is introduced, as wells, etc., and that now the disease prevails only in the new settlements where the drinking-water is derived from mountain brooks and mill-ponds.

At the last meeting of the American public health association Dr. Woodhull read a paper on this subject, urging the connection of drinking-water and malaria, instancing many examples, among others certain observations made in California by Colonel Mendell of the United States army, where he found many cases of intermittents in isolated localities and in neighborhoods where the conditions seem salubrious, but he observed that these cases were found in families supplied with water from shallow wells, while those whose drinking-water came from deep wells escaped the disease.

Enough has been said to show that these propositions are not mere theory, that there are reasons for believing that we are not prepared to desert the old views regarding the ill effects of marshes, saturated sub-soil and mill-ponds, and the good effects of drainage; and, further, that shallow wells may be responsible for even more ills than they are already accredited with.



One of the most notable advances in house building during the last few years is shown in the improvement which has been made in the appliances for household work, and the many added conveniences for kitchen, laundry and pantry. No thoughtful housewife can expect to obtain neat, careful and interested helping in a dark, badly-arranged and inconvenient kitchen, and no servant, if she is in any degree competent for the service she undertakes, will fail to work more happily and intelligently if her department is bright, well-appointed, and so furnished with conveniences that there thall be no excuse for waste or disorder. There are many houses where art and comfort might be greatly advanced by sacrificing half the lavish and confused display of the drawing-room to the necessities of the kitchen, on which the health and comfort of the household most vitally depend. The first requisite is a well-lighted and ventilated kitchen, large enough for the varied work which must be done in it. If any room must be made small and inconvenient, or any furnishing be left incomplete for economy's sake, let it be in the show apartments of the house, rather than in its most important department. There are many new and improved kitchen-fittings and appliances which are little more expensive than the old furnishings, because they are healthful and durable. At the store of E. Baggott, Nos. 195 and 197 Madison Street, a number of these improvements are shown. The best sinks are of enameled earthenware, galvanized iron or soapstone, those of earthenware being very clean and attractive in appearance. A sink should be set in a frame of hard wood, supported on legs, with the space underneath left entirely open. The closet under the sink, which used to be a dark receptacle for pots and pans, is one of the bygone abominations of the kitchen. Behind the sink there should be a facing of marble or zinc, at least two feet high, to keep the water from running down upon the woodwork. A very useful appliance shown at this store is a slop-sink. It is nearly square in shape, and is set lower than an ordinary sink. Its large waste-pipe has a moveable strainer, and its faucets are placed high enough so that a pail may be set under them. It is a convenience which all housekeepers, who know the annoyance of being obliged to use one sink for all purposes, will appreciate. In kitchens where several water-pipes run along the wall and ceiling, they may be rendered more sightly by being held in place by brass sockets screwed upon a brass plate. Where the pipes are also of brass, or of galvanized iron, they may always be kept bright and clean. This arrangement was first introduced into Mr. Vanderbilt's house in New York, and is very satisfactory. Another improvement which is useful where a great deal of cooking is done, is a grease collector. It consists of a double, copper cylinder, with a moveable inner tank, which is connected with the waste-pipe of the sink. The grease which passes into this tank with the waste water is chilled by a stream of cold water passing between the two outer cylinders, and becomes solid, remaining in the tank, from which it can be easily removed, while the waste water passes off into the pipe connecting with the sewer. The best laundry-tubs are of porcelain, or soapstone, those of wood being little used. They are set, like the sinks, on legs with no woodwork about them, except the capping, which should be of oak or walnut. Where there is a laundry these tubs should be without covers, and the wall behind them should have a facing of marble or zinc, in which the faucets should be set. In houses where the kitchen must serve as a laundry it is sometimes necessary to cover the tubs, the lids letting down with hinges, and serving as a table, but it is always better to leave them open to the air. All these sinks and tubs should be trapped, the plain S trap being the most desirable. For a butler's pantry, a copper sink is the best. In a house where expense is not a necessary consideration, a kitchen with these conveniences, with a tiled floor and wainscoting, with abundant table and closet room, and sunny windows, would leave little to be desired, and should become a means of health and good cheer to the household. The same improvement in the sanitary condition of the bathroom is seen in the furnishings which Mr. Baggott shows. Enameled and earthen bath tubs are used, although those of copper are most in demand. The tub should not be enclosed in woodwork, but, like the bowl and water-closet should be left entirely open. This arrangement may be objected to as ugly and inartistic, but it is necessary where cleanliness is absolutely indispensable, and this necessity may stimulate some artistic inventor to add to the ungainly bath the grace of an appropriate decoration that shall fit the sumptuous taste which this nineteenth century is so rapidly developing. Where wood is used, either to enclose the tub, or as a facing above it, it should be put up with screws so that it may be entirely removed for purpose of cleaning or repairing. A tiled floor and wainscoting are most suitable for a bathroom, and ample ventilation is of the utmost importance.

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Wool momie cloth is an excellent material for portierés, as it is strong and durable in texture, hangs well, and shows good colors. Its very moderate cost places it within the reach of people to whom the more expensive plush or velours hangings would be unattainable. Tinsel momie makes very effective draperies, the gold threads interwoven with the wool, lighting it admirably. A portieré of this material in olive and gold has a dado of lighter olive, with an applied design outlined with gold cord. There is a firm quality of burlaps closely woven in a basket pattern, which is excellent for door hangings, especially for summer use, or in country houses. It has a soft ecru tint, and takes a boldly outlined decoration in crewels finely. A portieré of this material, which is quite inexpensive, has a dado showing a Persian design worked in dull colors. Another of the same fabric, suitable for a bedchamber, has an applied decoration cut from a French cretonne and showing a conventionalized floral design. The figures are outlined with a tinsel cord, and lighted by occasional stitches and veinings of bright colored silk.

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Rattan and willow chairs may be made bright and comfortable for winter by plush cushions tied in place with ribbons. If the chairs have high backs, narrow head rests of the same material are pretty. A cushion of crimson or olive plush is a pleasing addition to a chair in the natural rattan color; one of old blue is admirable for a chair with mahogany stain, and one of golden brown for a gilded rattan chair or settee.

Martha Howe-Davidson.

MISREPRESENTATIONS CONCERNING SEWER-GAS IN A HOUSE.

Mrs. Georgiana Pierce rented a house at No. 474 West Randolph street, Chicago, of Morey & Snow, upon the representation of Mr. Snow, that the house was free from sewer-gas. A suit for damages was afterwards brought by the tenant against the agents. [See THE SANITARY NEWS, Vol. I., pp. 87 and 99.] The evidence was given tending to show that during the term of the tenant of the house the previous year sewer-gas and other bad odors, etc., had been prevalent in the house, and that Snow knew it; but that the house had undergone investigation and repairs between that time and the leasing to the plaintiff for the purpose of removing such nuisances; and that Snow was aware of such facts and had reason to believe that the object had been accomplished. The evidence tended to show that in less than two weeks after the plaintiff took possession she discovered that the house was seriously affected with sewer-gas (and that she had had previous experience with it in another house); that she soon thereafter made complaint about it to the defendants; that it not only continued at frequent intervals, but became more and more offensive; that after this discovery she not only remained in occupation of the house, but June 19, 1882, paid to defendants $84, being the amount of rent in full to July 1, 1882; that although subsequently, her health, that of her hired girl and some of her boarders became impaired and seriously affected in consequence of the presence, as she claimed, of sewer-gas in the house, and many of her boarders left her for that reason, she nevertheless continued in the occupation of the house. The evidence tended to show that she held possession of the premises for a long period after she discovered the alleged fraud.

The circuit court instructed the jury that this action was brought upon the alleged fraud and misrepresentations set forth in the declaration and for the alleged loss and damage resulting therefrom to the plaintiff, and the jury were instructed that the covenants contained in the lease would not be binding on the plaintiff in the case, if the jury should believe from the evidence and under the instructions of the court, that the plaintiff was induced to sign the lease by the fraud and misrepresentations of the defendants as charged in the declaration.

The defendants excepted to such instruction to the jury, and judgment having been given for $1,000 against them, they took the case to the appellate court of the first district, presided over by Judge McAllister. In his decision the judge said that, if fraudulent representations are made to a tenant before the execution of a lease that the premises are free from sewer-gas, and he moves in and pays rent and finds that the premisis are so infected with sewer-gas as to be injurious to health, it is the duty of the tenant, if he wishes to disaffirm the contract, to do so immediately and leave the premises; upon the discovery of the fraud is the time for the tenant to make his election. If the plaintiff by her acts is to be held to have affirmed the lease and made it good by election, she is not thereby debarred of her action to recover such damages as were the natural and proximate result of the fraud, if the fraud shall be proved. But whether she affirmed or disaffirmed the lease upon discovering the fraud, would be material in determining the proper rule of damages. If the lease was absolutely void as the court told the jury it would be if she was induced to sign it by the fraud and misrepresentations charged, then it would follow as settled law that she would be entitled to recover back for all she had paid or done under it. On the other hand, if she had affirmed it, or made it good by election, then she would not necessarily be entitled to recover back the rent she had paid or for what she had done under it, because it had been paid and done in the performance of a valid covenant, and she may have derived some benefit from the lease and use of the premises. The fact of affirmance might be an important element as regards the questions whether she used the diligence to prevent the accumulation of damages the law in such cases requires.

The decision was reversed and case remanded for a new trial.

COUNTRY SCHOOL-HOUSES.

TO THE EDITOR OF THE SANITARY NEWS: — In your journal for November 1, you refer to the movement of Dr. E. S. Elder, secretary of the board of health of Indiana, to procure a report of the sanitary condition of the school-houses of the state.

In making a survey of this county I have found that while, as a whole, the houses are fully up to the average, there is a good field for reform and improvement. The average country school-house is a flat box, about thirty-five feet long, twenty-four feet wide and ten feet high, resting on, or very near, the ground, covered with a roof of shingles, with three windows on each side for light and ventilation, and one door in the end. This "building" is placed as near as possible in the center of the district without regard either to the healthfulness or cheerfulness of the surroundings. Material enough is used in the construction of these houses, if put together according to some well-defined architectural plan, to make them both agreeable and healthy.

There are one hundred and twelve school-houses in this county for the accommodation of nearly eight thousand enrolled pupils. Sixty-six of them are of wood, and forty-six of brick. So far as size is concerned, the houses are all that could be asked, but with the exception of those in the city, and one or two brick country houses, the ventilation is wholly by means of windows. In the city of Huntington, the principal school-house is a fine structure, costing $35,000. It is heated by means of three furnaces in the basement, from which the hot air is conducted to the nine rooms by tin conductors. In each room, near the floor, for the purpose of outward ventilation is a register connecting with a flue in the chimney. The hot air enters at the front of the rooms, while the outflow is from the back. This gives good ventilation when the hot-air register is open, but when the room becomes overheated, and the register is closed, all supply of fresh air is cut off, and it becomes necessary to open windows or doors. This might be remedied by placing a large register in the ventilating-flue, at the top of the room, by opening which the temperature of the room could be lowered. This opening would also answer another purpose: By admitting a hot-air draft, the current would be increased and thereby more vitiated air drawn from the room through the lower register. In two of the rooms the light is admitted on the wrong side—from the back and right. This could be remedied by turning the seats. During the ten years that this building has been in use no death has occurred among the pupils while attending school. This fact speaks more for the vitality of the pupils than the mode of ventilation. So far as the country school-houses are concerned, the great need seems to be for some definite plan to guide the trustees of townships in their construction; and the architect who will give the design and specifications for a cheap country school-house involving a simple means of heating and ventilation, will indeed be a benefactor.

From the thoughts I have given the matter I would make the following suggestions: The present mode of lighting—from the right and left—should be retained. There should be a large double chimney, containing one flue for smoke and one for ventilation, in the back part of the room; these flues should come together above the roof of the house, so that the upper part of the ventilating flue would become heated by smoke and waste heat from the stove, thereby creating a greater draft in the ventilating flue; two registers should be placed in the ventilating-flue, one at the bottom, the other at the top of the room—the top one to regulate the temperature, the lower one for removing the vitiated air, both carrying outgoing air. The stove should be placed at the front of the room with the pipe running back to the smoke-flue in the chimney; this would give a large radiating surface, and the heat from the fuel would be nearly all thrown out into the room. For the purpose of supplying fresh air, a conductor of tin, or some other suitable material, to be controlled at the inner end by a damper or register, should lead from the outside of the foundation, under the floor, and into the room immediately under the stove; this would furnish fresh air without exposing the pupils to draft, and at a point where it would become heated before being respired. The black-boards to be used at recitations should be of a dead black—a preparation of ground slate is excellent—and placed in the front end of the room, so as to allow the class to face the door. The outer door should open into a small vestibule, with a cloak room for boys on one side and one for girls on the other. The ceiling should be at least sixteen feet high. A school-house constructed upon this plan would be well ventilated and pleasant, and the cost would not exceed that of the present oblong box more than $200.

The privies for the accommodation of pupils are placed on the back end of the lot over a vault dug in the ground and walled up with plank. When the vault is full another is dug. In no case have I learned of a privy-vault at a country school-house being cleaned out. The present practice would soon lead to a contamination of the water-supply, if wells were dug on the grounds, but in most cases the water is carried from neighboring farm-houses. Instead of privy-vaults, it would be better to have the privies built high enough to admit a strong box underneath, which

might be removed when necessary and replaced by a new one. These boxes would be kept deodorized and disinfected by means of dry earth.

As a rule, the grounds are wholly neglected, many not even inclosed by a fence, and if so enclosed the fence is of the roughest material, split rails, or at best unplaned boards. This slovenliness could be easily overcome, if officials high in authority (it is a matter not too insignificant for the governor, even) would have some day set apart for improving and beautifying the school-grounds by planting ornamental shade trees and shrubbery. We have our decoration day, devoted to the memory of the dead soldiers; why not have our school day, devoted to decorating and beautifying the houses and grounds in which the future men and women, citizens and soldiers, are to receive the foundation of their intellectual training? If such measures were once inaugurated, such a spirit of rivalry between districts would soon exist as to make our school-grounds present a much more attractive appearance than at present.

LaGrange Severance.
Secretary Board of Health, Huntington County.
Huntington, Ind., Jan, 21, 1884.

INSPECTION FOR WATER WASTE.

To the Editor of The Sanitary News:—We require all the water-fittings used in this city to be according to samples, to be seen in this office, and each fitting must be examined, tested, and stamped before it is used. For the prevention of the waste of water, we have a staff of twenty inspectors engaged in a house-to-house inspection; and we have some districts including a population of eighty thousand, under district meters and night inspection, the meters used being Deacon's, of Liverpool. I am, yours truly,

James M. Gale.
Corporation Water Works, Engineer's Office,
Glasgow, Scotland, Dec. 17, 1883.

BROOKLYN NOTES.

[Special Correspondence The Sanitary News.]

New York, Jan. 14, 1884.—It is reported that the arches of the New York approach to the Brooklyn bridge, between William street and the river, are to be built in and used for storage purposes; and, further, that the plumbing contract has been awarded to Mead & Rossman, of Fourteenth street. I will try to get some details for the next number of The Sanitary News.

Among Brooklyn plumbers, George Cummings has always ranked as a first class workman, and is the best dressed man in the trade. The windows of Mr. Cummings' store on Franklin street are of the most tasteful and attractive. He does a first-class "overhauling" business, leaving the new work to T. F. Harrington, James Keenan and others, who are prepared to handle that kind of work which abounds in this city of wondrous growth. If Mr. Cummings' place has the best exterior, George S. James,' further up Fulton street, has the most elegant interior. James Hosford and John Read, on Gates avenue, and John Lord, of Bedford avenue, have very handsome places. B. Samuels, on Atlantic avenue, and Mortimer J. Lyons, on Hicks street, are old-time plumbers, doing a quiet business. James W. Birkett, the genial president of the master plumbers' association, has a number of large contracts on hand, one of which is the plumbing of a ten-story apartment house, the largest in the city, and likely to remain so, as Brooklyn is a city of homes and not partial to flats or hotels. The firm of Lewis & Paterson, on Fulton street, takes first rank for good plumbing, and does a great deal of it. H. H. Quick, of DeKalb avenue, is a pushing fellow and his business is on the increase. Thomas H. Radcliffe, of No. 826 Fulton street, has just finished the plumbing of the Sængerbund building, on Schermerhorn street. The water purveyor, Peter Milne, jr., is a good plumber, the son of a good plumber. He is conscientious in the discharge of the duties of his office, and in the trade is generally liked. J. J. Powers, inspector for the board of health, served some years without compensation during the incipiency of that now august institution. He is now rewarded for his patience with $1,200 a year. In the days when he "carried the bag" he "helped" Edward Callahan, now of Court street. Mr. Callahan is an ingenious and skillful mechanic, who has ideas of his own. His former partner, Oscar O. Sawkins, is now in business for himself on the same block, and in days gone by both worked for James Armstrong, over the way. In addition to his headquarters on Court street, Mr. Armstrong has four shops in New York and Brooklyn, his business extending over the two cities. His son, James, jr., carries a part of the load, and is personally very popular.

Mayor Low recommends the expenditure of a half million dollars to double the size of the aqueduct, so that the water-supply (Ridgewood, best water in the United States) may not fall short for this vast and thickly populated area. Then, in ten years, the water-works (not thirty years old yet) will have to be increased again, says the mayor in his last message. The city is spreading away out into the country, and, though once only a great dormitory for New York, it is getting a reputation for its manufactures. It is first in the production of cordage, chemicals, and the refining of sugar. Its population will exceed a million in a very short time.

Away down in Gowanus [South Brooklyn] we find O'Keeffe & McKenna, who have plumbed many thousands of buildings of all sorts, and who are now doing more than ever. If we travel north from Fifth avenue, on a horse-car, for an hour and a quarter, we shall find ourselves in the heart of Williamsburgh, and can call on the busiest man within its borders, Mr. George W. Coger, vice-president of the plumbers' league. We shall find him a man of jollity and a man of sense. No man in town has a better trade. Perhaps we shall meet his right-hand man, Mr. Reynolds, as we prepare to cross the street for a call on McCormick & Knox. Here we find the manager, Mr. Robert Knox, son of one of the proprietors, who, though his head be not gray, has an old head on young shoulders. Farther up Broadway we shall find E. Gateson & Son, C. F. & T. D. Mentzinger, William Wilson, J. T. Matthews, H. Williams and Robert Smith. Gfroehrer & McCarthy, who have a huge trade in the mighty region dubbed New Germany, which has a population larger than Detroit. Geo. B. Hooton and A. C. Becker are on Grand street. John Bosch, of Flushing avenue, and J. Manneschmidt, of Hopkins street, come in for a large share of the German trade. Jos. Zoll & Co. do an immense amount of steam-fitting as well as plumbing. In Greenpoint, we find Edward Carley, Steven Alexander and J. H. Wamsley. Returning to the western district, we pay our respects to one of the oldest plumbers, Charles Robins; also to John Brown, Gaff & Nattrass, Harry Noble, Seinsoth & Parkinson, Gannon & Hueston, Wm. Hinch, Henry Anderson, Hugh Reid, Terry Ferguson, T. J. Walsh, F. A. Hutchinson, Martin Fallon, B. McBride, Walker & Woods, A. McGarvey, T. Pitt, S. R. Kimball, and conclude our rounds at the pioneer shop of W. J. Hosford. P. & J. Foley, in Willoughby street, are accredited with being among the best plumbers. James Foley is the inventor of several well-known specialties now in the market, and can show many novelties in sanitary fixtures, but he is a modest man. As we go toward the bridge we see W. J. Roche, sanitary inspector, on his rounds in a light wagon; Peter Moffat, his colleague, may be seen in the eastern district. Practically, Brooklyn and New York are one city, and if James Muir goes to Brooklyn to "do" the "historical building," James Armstrong goes to New York to "do" the marble building on Broadway and Liberty street. It is union and reciprocity with some competition thrown in.

"X."

STATE ASSOCIATION OF MASTER PLUMBERS.

To the Editor of The Sanitary News:—State association of master plumbers and their incorporation under state laws, has long been a hobby with me. It is one more move on the plane that is desirable, and your city, it would seem, is to-day prepared to grasp the idea. I would like to write you at length on this subject, but have not the time. We must not, however, lose sight of the one important step, the first in all that pertains to our success, and that is, organization. We are now fully in the field; thirty-six cities are now organized. I will, if my life and health are spared, produce at our next annual meeting, representatives from fifty cities. Yours truly,

A. Mead,
Chairman Executive Committee,
National Association of Master Plumbers.
New York, Jan. 8, 1884.

THE CINCINNATI PLUMBERS.

To the Editor of The Sanitary News:—I am in high favor of the incorporation of master plumbers' associations, which I have seen suggested in The Sanitary News, and would like to see it done in our state; but I am afraid that the Cincinnati association will not do much

to assist in bringing this about, as the members take very little interest in the meetings. Mr. Allison, our secretary, is the most active member we have, but he has been appointed exposition commissioner for 1884, and will have his time pretty well occupied. The committee on legislation are making an effort to have a law passed, at the present session of the legislature, to regulate plumbing in this city. Communications have been sent to the chapter of the American institute of architects and to the two medical associations, stating the object desired to be attained and asking them to meet with us. If we do not succeed in this move. I am afraid our association will not be represented at Baltimore.

I remain, yours truly,

Cincinnati, Jan. 13, 1884. THOMAS G. NESKI.

CONCERNING INCORPORATION.

TO THE EDITOR OF THE SANITARY NEWS:—Noticing that the subject is agitated in THE SANITARY NEWS, I wish to express my opinion concerning the suggestion of the health department of Chicago, to the association of master plumbers of your city on the advisability of becoming incorporated under the state laws. I think it a very important and valuable suggestion, and certainly a strong evidence of a friendly relation existing between those two bodies. A municipal department that recommends a mechanical organization to strengthen itself under the laws of the state, is clear-headed, particularly in a case of this kind where both are interested in the health of the people, and the sanitary condition of their dwellings. An association of master plumbers incorporated becomes, through its members, a force of many combinations. Being legalized by the state, it is a dynamo of moral, as well as strong mechanical, influence. The association becomes an individual by state authority. It can sue and be sued, collect its members' debts, form within itself insurance companies, become a manufacturer, or an establishment for the purchase and sale of plumbing materials, can advance the science and genius of its members, educate and ereate a warm feeling, a friendly and business intercourse, and, in fact, it becomes a guild in its entire sense. But its members must be fully up to the standard to realize their relations to the association, before the society would be in thorough working order; and, if a doubt existed as to the want of proper qualifications in the members before incorporation, it would be better to reorganize and leave out the unworthy ones. I trust that whatever the association of master plumbers of Chicago may do, they will always be successful. I had the pleasure of meeting a number of them in New York last June. The Garden City of the west deserves credit for sending such a body of men to the convention held in New York to represent our trade in that section of the country. I am happy to say that I am no stranger to Chicago, for it was there that I took my first lessons in plumbing, a student of 1853, and, of course, I will always take an interest in whatever advancement may be made in connection with the plumbing business of your great city.

Yours very faithfully,

THOMAS BYRNE.

New York, Jan. 18, 1884.

TO THE EDITOR OF THE SANITARY NEWS:—In relation to the question of state organization of master plumbers' associations, I would say that I am heartily in favor of state organization, incorporation, co-operation, or any kind of manipulation that will enhance our own interests and promote publie good. I am satisfied, after some experience here, that nothing short of legislation, sharp and healthy, will save us.

I congratulate the master plumbers of your city for the very able and energetie manner in which they are, as an organization, pushing things in the right direction. Their example is worthy of imitation by all those who are at all interested, in the trade and out of it; and who is not or should not be? I have nothing new to offer from this quarter. The few active ones are doing all they can and find it an up-hill job. The majority are seemingly content to jog along in the old way.

In conclusion, I congratulate you upon the success of your paper, and the very able manner in which you support the organization in your city. Continue on in the good work and may your efforts bring you many subscribers. Very respectfully, JAS. ALLISON.

Cincinnati, Jan. 19, 1884.

CURRENT PUBLICATIONS.

DANGERS TO HEALTH.—TEALE.

D. Appleton & Co. have issued a fourth edition of T. Pridgin Teale's pictorial guide to domestic sanitary defects. It is printed on extra heavy paper, and the lithographed illustrations are very instructive in their tendency. There are seventy plates representing various bad conditions of house drainage and sanitation, and their remedies. The book may answer a double purpose. It may show to the builder what errors to avoid, and the sanitary inspector what to look for in suspected houses. The book may be obtained in Chicago of S. A. Maxwell & Co. at $3.00.

PARKES' HYGIENE.

William Wood & Co., of New York, have recognized the strong interest which many physicians have in sanitary science by publishing Parkes' Hygiene as a portion of Wood's library of standard medical authors, of which series the two volumes form the issues for September and November, 1883. Parkes' manual has been, since its publication, the standard work of reference for hygienic students. Since the lamented death of Mr. Parkes, the work has been edited through several editions by his friend and co-laborer, Francis de Chaumont. The present edition is supplemented by an appendix giving what is termed the American practice in matters relating to hygiene prepared under the supervision of Mr. Frederick N. Owen, C. E., in the introduction to which he has made an error in stating that Massachusetts organized the first state board of health in 1869, as the board of health of Louisiana was constituted some ten years previously, and also in crediting the paper on ventilation by Mr. Warren R. Briggs, of Bridgeport, Conn., to the Michigan state board of health, when it was first published in the report of the state board of health of New Hampshire. Elwyn Waller, Ph. D., a chemist in the health department of New York city, is the author of the section of the American appendix on water; Dr. D. F. Lincoln contributes an article on ventilation and warming, and E. S. Philbrick, S. C. E., writes a valuable paper on the removal of house-waste. The appendix adds to the value of the work. No commendation is needed for the publication, but much is due the publishers for bringing it out in such attractive shape, and at about one-half the price of previous editions.

IOWA STATE BOARD OF HEALTH REPORT, 1883.

The above report is an interesting presentation of the methods which our state boards of health employ to disseminate information. Portions of the correspondence deemed particularly important are given in the secretary's report. They contain much knowledge valuable to the people addressed. Papers on ventilation, hospitals for contagious diseases, and on the geology and topography of Iowa, and a method of resuscitation of the drowned are appended to the report proper.

FIRST REGISTRATION REPORT OF IOWA, 1881.

This report makes a bulky volume of over eight hundred pages, of which all but twenty-eight pages are occupied by tables. As to the value of the system of registration (save as a stepping-stone to something more perfect), it may be said that the marriage rate is given as 2.42 per cent lower than Massachusetts for the same year with nearly the same population. The birth-rate, shown by the records to be 18 + per thousand, is estimated to be 33 per cent too low. The compiler estimates that the number of deaths reported, 10,668, to be but 40 per cent of the correct number of deaths. The estimated death-rate for 1881 was sixteen per one thousand of the population. Neither the value of vital statistics, nor the difficulty in securing them, is underestimated, but it is believed to be unnecessary to publish nearly eight hundred pages of tables based upon such incomplete returns, when all that is important is contained in the summary of twenty-eight pages.

PUBLICATIONS RECEIVED.

"Quarterly Compendium of Medical Science." Edited by D. G. Brinton, M. D., and Joseph F. Edwards, M. D., January, 1884. 115 South 7th st. Philadelphia. Pp. 144.

"First Registration Report of the State Board of Health for the year ending October 1, 1881." DesMoines: Geo. E. Roberts, State Printer, 1883. Pp. 811.

"Second Biennial Report of the State Board of Health of the State of Iowa. for the fiscal period ending June 30, 1883." DesMoines: Geo. E. Roberts, State Printer. 1883. Pp. 417.

"Annual Report of the Board of Regents of the Smithsonian Institution, showing the operations, expenditures, aad condition of the institution for the year 1881." Washington: Government Printing Office. 1883. Pp. 839.

"A Manual of Practical Hygiene." By Edmund A. Parkes, M. D., F.R.S. Edited by F. de Chaumont, M.D., F.R.S. Sixth Edition with an appendix giving the American practice in matters relating to hygiene, prepared by and under the supervision of Frederick N. Owen, civil and sanitary engineer. Volumes I and II. New York: William Wood & Company. 56 & 58 Lafayette Place. 1883. Pp. 368 and 556.

"Eighth Annual Report of the Australian Health Society, Oct. 18, 1883." Pam. Pp. 16, Melbourne.

NOTES AND NEWS.

ANNOUNCEMENTS.

February 1, at Cincinnati, Ohio, annual meeting American Society of Civil Engineers.

February 1, at Chicago, opening of the Manual Training School.

February 6, at Chicago, regular meeting local Master Plumbers' Association.

February 14 and 15, at Columbus, Ohio, first meeting of the State Sanitary Association.

February 19, at Cincinnati, Ohio, annual meeting of the American Society of Civil Engineers.

August 21–27, at the Hague, fifth session International Congress of Hygiene, Dr. Overbeck de Meyer, secretary.

BUILDING ITEMS.

Among the architects submitting plans for the new capitol of Georgia, are Edbrooke & Burnham, of Chicago.

Martin Maier, of Detroit, will erect a large building for his trunk store.

A $200,000 court-house will be built at Muncie. Ind.

Work has been begun upon the ruined extension of the Wisconsin state house.

It is reported that Marshall Field will place an office-building on the vacant square belonging to him bounded by Fifth avenue, Jackson, Franklin and Adams streets, Chicago.

SEWERAGE

Nantucket, Mass., is talking up a sewerage system.

The lowest bid for the construction of the Ninety-second street sewer, in Hyde Park, Ills., was $3.23 for per lineal foot, or $7 per foot for the sewer and improvement.

The city council of San Antonio, Texas, have decided to adopt Major Humphrey's sewerage estimates, and to appropriate $350,000 for that purpose. The vote is to be taken Feb 25, and only property holders are to be allowed to exercise the right of suffrage.

The master plumbers' association of Chicago has been licensed, by the secretary of state of Illinois, without capital. The incorporators are Andrew Young, Thomas C. Boyd, James J. Wade and Alexander W. Murray.

A sanitary inspector in London is prosecuting a man for allowing the water-closet to be used as a bakehouse.

WATER-SUPPLY.

Nantucket, Mass., has introduced the Wannecomet water for its public supply.

The town of Hyde Park, Ill., was entirely without the public water-supply on January 10, caused by anchor ice at the mouth of the supply-pipe.

The town of Jefferson will lay five miles of pipe and offered to pay $56 a day to Chicago for 700,000 gallons of water.

COMMUNICABLE DISEASES.

An investigation of the outbreak of diphtheria at the Batavia, N. Y., blind asylum, showed that the concrete drain intended to conduct the sewage to a swamp back of the buildings had fallen to pieces and the earth had stopped the passage.

At Strichen, Scotland, the source of typhoid fever infection has been traced to milk from a farm where there were cases of it.

The reports of the Boston sanitary inspectors concerning the schools are to be examined by a joint committee from the boards of health and education, and the needed changes made.

The pneumonial micrococcus has been cultivated and used in inoculation of dogs by Carl Friedländer, of Berlin.

The city attorney of Chicago has decided that physicians who refuse to report cases of communicable diseases, are subject to prosecution under the ordinance. No fee is allowed to the reporter.

PERSONALS.

Dr. Thomas U. Flanner, health officer of Quincy, Houghton Co., Mich., died January 17, of Bright's disease.

August W. H. Reen, of Peoria, succeeds Dr. John McLean on the Illinois state board of health.

Dr. S. S. Herrick, secretary Louisiana state board of health, is suffering from a long-continued illness.

Dr. R. Martin, health commissioner of Milwaukee, has been inspecting the ice-supply in the interior of Wisconsin.

SANITARY APPLIANCES.

[*Under this head* The Sanitary News *will publish, in each issue, a complete record of all the latest patents of sanitary appliances issued at the United States patent office. Cuts will be reproduced of such as seem to have special merit. Single copies of printed specifications and drawings of any patent will be forwarded by* The Sanitary News *on receipt of twenty-five cents.*]

291,818. Steam-Heating Apparatus. Frederic Tudor, Boston, Mass. Filed Dec 16, 1882.

291,836. Window-Screen. Geo. W. Boynton, West Oakland, Cal., assignor of one-half to Joseph H. Baker, same place. Filed Oct. 10, 1883.

291,857. Water-Cooler. John Edward Welling, Georgetown, Ky., assignor of one-half to Justice Webb, same place. Filed Oct. 31, 1883.

291,060. Fire-Escape. William F. Kientoff and Philip Bertemes, Englewood, Ill. Filed Feb. 19, 1883.

291,068. Hydrant. Carl Meyer and William H. Laufersick, Cincinnati, O. Filed June 19, 1883.

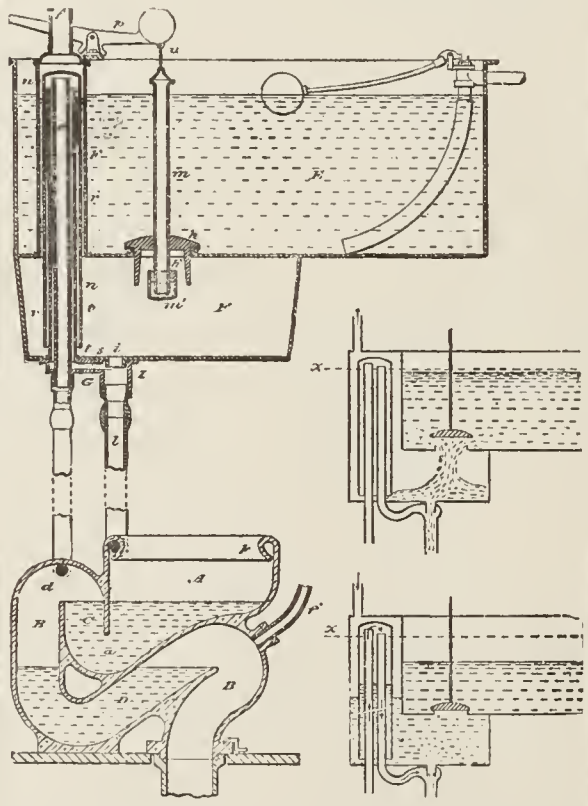
291,083. Water-Filter. John Reid, Wheeling, W. Va. Filed April 9, 1883.

291,114. Building-Block. Joseph Wadleigh, Wilks Grove, Ill. Filed April 9, 1883.

This block is composed chiefly, as to its bulk, of straw pressed flat, with so much concrete or clay intermixed as to cement the pressed straw together. The blocks are bound together by wire.

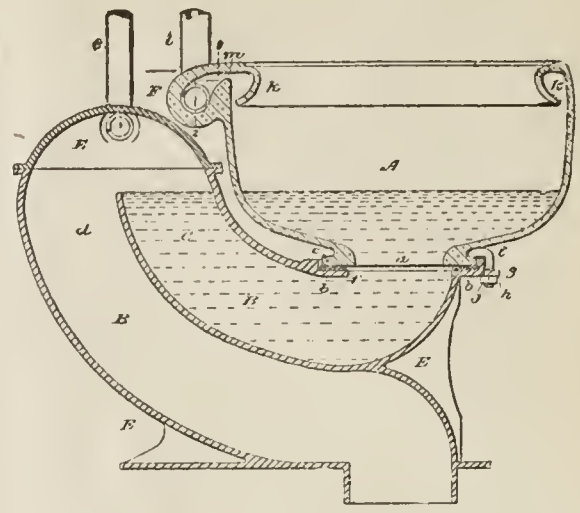
291,135. Faucet. Anthony A. Bennett, West Stratford, Conn. Filed July 5, 1881.

291,139. Flushing Apparatus for Water-Closets. Jas. E. Boyle, Brooklyn, N. Y. Filed March 12, 1883.



The special features of this apparatus are a reservoir-tank, E, a flushing-chamber, F, to be filled from it, a suction-injector, I, arranged beneath the outlet of the chamber, a flushing pipe leading downward from the injector to the water-closet, an air-pipe opening into the upper part of the chamber, and a suction-passage extending from this pipe to the injector, the whole so operating as to break the vacuum in the suction-pipe before all the water has escaped from the chamber, whereby an after wash is secured.

291,140. Water-Closet and other Bowls and Pipe Connections therefor. Jas. E. Boyle, Brooklyn, N. Y. Filed March 12, 1883. Patented in England Feb. 23, 1882, No. 882; in France, Feb. 28, 1882, No. 147,614; in Germany, March 2, 1882, No. 20,286; in Belgium, March 13, 1882, No. 57,349; in Austria-Hungary, May 8, 1882, No. 8,083, and in Canada July 3, 1882, No. 31,219.



The bowl is provided with a hollow, tubular barrel, F, molded in one piece with it, having opposite open ends, and with an opening through the side of the bowl, affording communication between the cavity of the barrel and the interior of the bowl. A water-seal is provided at the connection between the pipe and the bowl by which the air in the pipe is normally isolated from the bowl.

291,158. Water-Supply for Cities. Dewitt C. Cregier, Chicago. Filed April 15, 1882.

The distributing pipes have valves between them, regulating the supply from the mains, which open directly into the pipes. A pump serves as an intermediate connection between the mains and pipes.

291,159. Water-Supply for Cities and Towns. Dewitt C. Cregier, Chicago. Filed March 9, 1882.

The water is supplied under separate high and low pressures, and there are devices for maintaining the pressure uniform after the proper degree has been obtained.

291,161. Faucet Attachment. Louis Danhoff, Passaic, N. J. Filed Aug. 1883.

291,171. Bracket for Electric Lamps. Henry Edmunds, jr., New York, N. Y., assignor to Thomas J. Montgomery, Boston, Mass. Filed April 5, 1883.

291,176. Fire-Proof Compound. Lawrence Feldin. San Francisco, Cal. Filed June 18, 1883.

291,198. Fire-Escape. Hugo Kafka, New York, N. Y. Filed July 20, 1883.

291,215. Method of Decorating Walls, etc. Matthew Moneyment, Philadelphia, Pa. Filed Nov. 16, 1883.

291,285. Floating Filter. John H. Breese, Davenport, Iowa. Filed July 23, 1883.

291,322. Means for Ventilating Bow-Windows. Chas. S. Foos, Baltimore, Md., assignor of one-half to William H. Clifford, same place. Filed Sept. 8, 1883.

291,347. Heater for Steam and Water. Alden Holt, Boston, Mass Filed Aug. 17, 1883.

291,482. Combined Wood and Broken Stone Pavement. William A. Amberg, Chicago. Filed Nov. 26, 1883.

This pavement consists of a stratum of wooden blocks supported upon a suitable foundation, covered by a stratum of hard broken stone, and a surface stratum of hard, finely-broken stone. It is designed to use the same process to restore worn or partly decayed wooden pavements.

291,510. Apparatus for Warming the Upper Rooms of Buildings. John S. Heizer, Rushville, Ind. Filed June 30, 1883.

291,647. Water-Meter. Charles W. Van Alstine, Chelsea, Mass. Filed July 2, 1883.

291,666. Ventilator. John M. Ayer, Chicago. Filed Sept, 29, 1883.

This consists of two hollow cylinders, one open at both ends, to serve as the air-passage, and to fit within an opening in a window-sash, or wall, and the other closed at one end, and provided with side perforations, each having screw-threads and fitting, one into the other, so that the turning of the perforated cylinders carries it back and forth with relation to the other and opens and closes the perforations.

291,668. Self-Closing Faucet. Silas and Samuel L. Barker, Hartford, Conn. Filed April 18, 1883.

291,734. Artificial Stone. William Howells, Philadelphia, Pa. Filed Nov. 19, 1883.

This consists of muriatic acid, flour of sulphur, molasses, iron scale, sand and cement.

291,808. Stop and Waste-Cock. Henry Taylor, Richard B. Sharp and Thomas J. Cain, Cleveland, O. Filed Jan. 15, 1883.

Current Topics.

In the present number of The Sanitary News the usual editorial comments on current topics cover a wide field; the specifications for Chicago sewerage are continued; Dr. Frederick Eklund's interesting paper on the sanitary administration of Sweden is continued; the series of valuable illustrated papers on the sewerage of Nahant, by E. W. Bowditch, is concluded; the sanitary examination of Chicago schools is inaugurated with an article on the new Keith school; there are some very interesting plates showing the proper construction and the heating and ventilation of model school-rooms; the house interior presents some model kitchen arrangements; there are several interesting letters from correspondents; the criticisms on current santary literature are a reliable guide to those who desire to read or purchase books; the notes and news cover the usual wide field of information; the record of new illustrated patents is complete, and full reports of all sanitary associations throughout the country are published.

Sir Joseph Bazalgette, C. B., president of the English institution of civil engineers, in his recent inaugural address, stated that the "ultimate object of all sanitary science was the comfort and convenience of the living, and the reduction of the death-rate." He used the idea, if not the words, expressed in the legend of The Sanitary News,—*healthy homes and healthy living.*

From a paper by Dr. Hinsch, read before a sanitary meeting at Hamburg, the following conclusions are drawn: There are no objections to cemeteries well drained and provided with vaults constructed on the cell-system; that subsoil drainage may keep the level of the water below the level of the graves; and that with these precautions the air of cemeteries will not be different from other ground-air. There may be a possibility of preventing the pollution of the ground-water, as Dr. Hinsch suggests, but the probability is not great that it would be entirely successful. In rains the ground becomes saturated with water over, as well as between, the graves, and this water is very likely to be contaminated.

While the overcrowding of people in Paris may not be as dense as it is in London, it has its results on the health of the people. Dr. Brouardel states that the diseases especially increased by overcrowding, like typhoid fever, diphtheria, scarlet fever and small-pox, have doubled in intensity.

In the disposal of its excreta, the city of Manchester, England, is peculiar for so large a town. Each house is required to have a dry-earth closet, sixty thousand of the old form of privies having been abolished in the past ten years. The contents of the dry-earth closets are removed twice a week, and the night-soil (a misnomer) is sold to farmers, made into concentrated manure, and into a superior quality of mortar which sets very hard.

The city of Manchester, England, has water-reservoirs covering eight hundred and fifty-four acres; the works already constructed have cost £3,352,000, the length of their mains is six hundred and forty-three miles, and they supply twenty million gallons to nine hundred thousand people daily.

Readers of the article on hygienic instruction in colleges have kindly called the attention of The Sanitary News to the fact that there were omitted the Philadelphia polyclinic and college for graduates in medicine, which has a department of clinical chemistry and hygiene; the university of Michigan, at Ann Arbor, which has a lectureship on hygiene in its school of political economy, and the Albion college, also in Michigan, which has a course of lectures on hygiene. In addition to the above, Dr. W. W. Watkins has been appointed lecturer on state medicine and hygiene, in the St. Louis college of physicians and surgeons.

Wm. M. Smith, M. D., health officer of the port of New York, invites a conference of the coast health authorities on the subject of the regulation of quarantine for the best interests of the public health and of commerce.

Every breath we expire is a funeral procession bearing away dead matter

A bill to establish a bureau of animal industry and prevent the spread of contagious diseases among domestic animals has been introduced into the house of representatives by Mr. Hatch, of Missouri.

Professor Virchow recently said that the prohibition of the importation of the American hog into Germany was a move in the interests of the great land-holders of Germany, who found their profits much decreased by its importation. In order to be consistent, he says that the Bundesrath should prohibit the raising of hogs in Germany.

If unsanitary conditions are not the cause of certain diseases, their influence is apparent to those who have endeavored to trace effects to causes. In his mortality report for December last, Dr. C. W. Chamberlain, secretary of the Connecticut state board of health, in referring to the malignancy of diphtheria and scarlet fever in Hartford and other cities, says: "The effect of unsanitary influences inside the house has been shown in repeated instances. In several cases where everything was apparently right, a careful search revealed very serious defects. Lead soil-pipes are sources of constant danger—one day to all appearance perfectly sound, the next large rents from corrosions appear, or the seams separate. It must be remembered that air from drains that has been in contact with putrescing, organic matter is, by far, more dangerous when mingled with the atmosphere of the house than with the air of the street. With the present lack of proper ventilation the impurities are confined in the house where there is seldom a complete change of the whole atmosphere of a room, with all the advantage given by cracks and crevices, so that the air is proportionately much more contaminated, and sooner or later the disease germs find their way into the system."

A committee of the Chicago citizens' association have found in practical use, on the furnaces of two of the largest bank buildings in the city, smoke-preventing appliances, which do the work expected of them. That smoke can be prevented is patent to all save the authorities and those owning furnaces.

Dr. Elisha Harris, secretary of the state board of health of New York, died at Albany, on the morning of January 31. This country is so young in its sanitary experience that the earliest leaders and advocates of the reform are nearly all living, working shoulder to shoulder with the younger recruits. It is this fact which makes us mourn the death of a leader more than we would were we in the second and third generations of sanitarians. Dr. Harris was born at Westminister, Vermont, March 15, 1824, and graduated from the college of physicians and surgeons in New York city in 1849. In 1855 he was appointed chief physician at the Staten Island quarantine station. It was his thorough comprehension of the problems of quarantine necessities which, to a great degree, led to the details of the present system of quarantine measures as practiced in this country. In the rebellion, his services in connection with the United States sanitary commission were most marked A railway ambulance of his device was awarded a bronze medal at the Paris exposition in 1867. After the war he rendered important aid to the New York state prison commission. In 1869 he was made sanitary superintendent of New York city, in which year he made the first thorough examination of tenement-houses, now know as the sanitary survey of 1869. In 1873 he became registrar of vital statistics and held the office for three years, when the office was abolished by legislation. In 1880 he was elected secretary of the newly-constituted state board of health and superintendent of vital statistics of New York, which position he held at his death. The board owes much to him for its existence and more yet for his executive guidance. As secretary and president of the American public health association his work is well known, and while he was prevented from being present at its last meeting, at Detroit, he was vitally interested in its success. His papers on vital statistics and kindred branches of sanitary science, form a part of the best literature of the subject. These papers appear in the transactions of the American public health association and the American social science association.

That men are sometimes appointed on our state boards of health for political purposes only is well-known, but that there should be a single state board of health which is so little interested in sanitary science as not to care to be informed as to its progress, The Sanitary News was not quite prepared to believe until it was so informed by the secretary of such a board. Not in the exact words above given, perhaps, his statement was to the effect that there was but one member sufficiently interested in the subject to make a study of sanitary science. With most of our boards the secretary is the only member who does much work. This may be expected when he is the only man who receives any compensation. But, a man having accepted his appointment as a member, his acceptance should be judged as an indication that he is willing to accept the responsibilities of his office That these responsibilities include one which should lead him to keep himself informed in the progress of public health, goes without saying. If our state boards of health are not to be in advance of the people, there is not such a pressing necessity for their existence.

In speaking thus, The Sanitary News wishes itself understood that no person or journal is more in favor of sanitary legislation and sanitary administration than it is, but also wishes its readers to understand that it most emphatically condemns amateur and impracticable work when done by these boards, which are supposed to embrace the most advanced sanitarians in their different states, but do not. It is time more than one of our state boards of health did some original and valuable scientific work. Instead of this, the same old sanitary scarecrows in different habiliments are presented year after year, with, apparently, the idea that the people need to know but one truth, and that the trinity of the ancients, that public health would follow pure air, pure water and a pure soil. They certainly should know it, if our various state-board-of-health reports were distributed. Up to the present time the boards of this country have been willing to take about all their new knowledge from English, German, and French investigators, without even verifying the statements or experiments. It is not many years since the idea that filth and scarlet fever and diphtheria had any etiological connection was entirely ignored, but the belief that there is some connection has grown, and there is now a respectable minority who so believe. Have our state boards of health ever done any work which would prove or disprove this supposed connection? Not one has done more than ask its correspondents concerning it, and the latter have replied as their prejudices would lead them to think. Each state board of health should have a laboratory and a man in charge of it who is capable of carrying forward original scientific investigation. When this is the case, our state boards of health will be a hundredfold more powerful for good.

Mr. Young, member of the national house of representatives from the state of Tennessee, introduced a bill on January 8, to amend an act entitled "an act to prevent the introduction of infectious and contagious diseases into the United States, and to establish a national board of health." The amendment consists in adding to section two, several more sections, which, among other things, provide for the co-operation of the national board with state boards of health; the inspection of vessels; obtain information concerning the sanitary condition of foreign ports; that the president may detail officers from other branches of the government to assist the board without additional compensation; that the unexpended appropriations on the books of the treasury department be made available, etc. It is probable the bill will be materially amended, and possible that the act of June 2, 1879, will be re-enacted in its place.

An eminent engineer in speaking on the subject of the density of population, and as to the relative value of flats and separate houses in relieving it, says, in effect, with flats more air-space can be given to each individual, streets may be wider, and more persons may live on a smaller area. This is undoubtedly a defensible position. Paris has an area only one-quarter as large as London, and has one hundred and sixteen persons on an acre, while London has but fifty-three persons per acre; yet Paris is not by any means twice as crowded as London. The same engineer in suggesting a very comprehensive scheme for the improvement of cities, asks: "What should be the width of the streets? To what hight should the houses be restricted? What should be the minimum air-space allotted to each individual in the

houses? What proportion of the area of a city should be set apart for its recreation grounds? What should be the regulations to be enforced to secure the effectual combustion of fuel, and to prevent the contamination of the atmosphere by smoke?" He answers the first by saying that the width of a street should not be less than two-thirds of the hight of the houses surrounding it, which, as he will probably admit, will have to be decided by the restrictions placed upon building, as the streets are laid out before the buildings are constructed. As to the hight of the buildings he would limit them to the hight at which water might be supplied to the upper stories, and also the hight to which a useful jet of water can be thrown in case of fire. With stand-pipes and improved apparatus, now in use in this country, water may be raised to almost any hight, and the fire question does not count so much.

It is curious as well as instructive to study the relations between the death-rate and the sewerage and water-supply. For instance, St. Petersburg has a death-rate of 35.2 per thousand, and has no sewerage, while the Neva is its water-supply. The Neva is contaminated by filtration from the privy-combed soil. Pekin has a death-rate of fifty per thousand and has no sanitary works worth mentioning. Cairo has a death-rate of thirty-seven per thousand; it has no sewers and the Nile water-supply is contaminated by excreta.

From some of our larger cities come discouraging reports as to the success of the master plumbers' associations. They maintain a precarious existence, kept up by two or three interested men. From other cities come the most encouraging reports and results of most active work. Why is this difference? The Sanitary News believes it is due to the fact that the prosperous organizations started out with something to be done at once, and from the interest then engendered, have kept "booming along" steadily, gathering more and more momentum, until it looks as if there was no limit to their activity. Let this be a warning to new associations, to lay out a campaign of work at once, after their organization is effected.

The Philadelphia association of master plumbers has taken action which will materially simplify the vexing apprenticeship question. They have resolved to maintain a plumbing trade school, in which the art and practice of plumbing may be taught. This school will be inaugurated with a public meeting on February 18, and there seems to be every reason for believing that it will prove successful.

The retaliative legislation on the pork question will probably take the form of a prohibition of the importation of adulterated wines. It might appropriately prohibit the landing of diseased and pauper immigrants.

A judge in New York has manifested stupendous ignorance, or willful prejudice, in an opinion delivered in a case where the tenant sued the landlord for defective house-drainage. This judge says: "The residents of all towns are in a state of alarm from actual or supposed malaria which all sewers generate, and there is probably no house in this city which is free from occasional smells that such a system has evolved. This may arise from many causes, as want of attention on the part of the tenant, or unscientific plumbing, although in general it may be said that it exists in the very nature of things, and if a tenant wants all the 'modern conveniences,' he must put up with the modern smells." There is no doubt that he has never seen a good job of plumbing, or that he is very prejudiced on the subject. Hear him again: "If a tenant elects to hire a house which empties into a sewer, with ramifications throughout his sleeping apartments, he does so with all the liabilities that such an election engenders, and with full knowledge that no plumber has yet been able to keep out the gas or prevent the smells." Every person who has had any experience knows there are any number of instances where plumbers have been able to keep out gas and prevent smells.

Small-pox begins to appear here and there about the country with increasing frequency. In Indianapolis there is a very disagreeable epidemic among the prisoners at the county jail, with prospects of its spread outside. At Cincinnati there are fears of the disease being imported from Louisville, and the health officer has forbidden the importation of rags from that city, he having heard that there are seventy cases of small pox in the Louisville hospital, and others scattered about the city. In Chicago there are several cases reported at the hospital, some of which are from suburban towns.

From the records of the registrar-general of the Hawaiian kingdom, it is learned that in 1879 there were nine hundred and sixty-one more deaths than births; in 1880 and 1881 there were three hundred and ninety-two more deaths than births, and in 1882 and the first half of 1883 there were three hundred and ninety-one more.

In a recent issue *The Medical Times and Gazette* states the question very lucidly, thus: "In London during last week two hundred and five deaths occurred from preventable diseases, and forty-seven from more or less preventable accidents. That is to say, if our sanitary legislation had been more satisfactory, our sanitary administration more efficient, and individuals more careful and attentive to their responsibilities, the death rate might have been under 15·0, instead of over 18·0."

The chief of the department of public works of Chicago estimated that the sewerage branch of his department would need $431,379 during the coming year. The controller allowed $297,836. The health commissioner asked for $205,615, and the controller thinks that department should have $152,400.

The sanitary authorities of Rio Janeiro are now empowered to inflict a fine of $30, and an additional fine of $3, on the owners and tenants of overcrowded courts, lodgings, etc., for each person over the proper number. The places may be closed up by the board of health until they are repaired; if this is not done, the government may close, or pull down the building. The building department of the city will not allow any courts or small houses to be built within certain limits.

CHICAGO SEWERAGE — SPECIFICATIONS. — XX.

SHEETING AND BRACING.

In case the depth of the excavation, or the character of the ground, renders it necessary to secure the protection of the work, the street, or the workmen, the sides of the trench are effectually supported with suitable planks and timbers by the contractor, without any expense to the city. Wherever it is thought necessary by the commissioner of public works, the timber remains in the trench after the completion of the work, and the contractor is paid by board measure, and current rates; otherwise, the sheeting and braces are removed as the back-filling progresses.

FOUNDATIONS.

Wherever the ground is sufficiently firm and unyielding, the masonry, or pipes, are laid directly on the bottom of the excavation; but wherever this is not the case, the contractor is required to furnish and put in place, without extra expense, sand, gravel, or other suitable material; if it is considered necessary by the commissioner of public works, the contractor is also required, without extra expense, to lay a foundation of plank or timber.

PROTECTION AGAINST WATER.

The contractor is required to do all the pumping and bailing; to build all drains, and do all other work necessary to keep the trench and sewer clear of water during the progress of the work, and until the cement mortar is sufficiently set to be safe from injury. To this end, in wet trenches, he must keep a channel open on each side of the work during its construction, which shall be so maintained as to catch the water from the sides of the trench and conduct it to a sufficient sump, or bail-hole, in front of the work.

MATERIALS.

All materials, of whatever nature, required in the construction of the sewers, except man-hole covers, and such lumber only as is hereafter mentioned, is furnished by the contractor.

BRICKS.

The bricks used are of the best quality for the purpose for which they are intended, uniform in quality, sound and hard burned, free from lime and cracks, and have a clear ringing sound when struck. They must be whole, with edges full and square, and of standard dimensions, viz., 8x4x2¼ inches. The bricks are inspected upon the ground when delivered, by an inspector, appointed by the commissioner of public works, and all "bats" and defective bricks are rejected.

PIPES.

The pipe must be straight, smooth and sound, thoroughly burned and vitrified, well glazed, free from lumps or other imperfections, and with the least possible variation from the specified dimensions, or true cylindrical shape. All straight pipe must be straight in the direction of the axis of the cylinder, and the inner and outer surface of each pipe concentric. The standard of thickness, for eighteen-inch pipe, is 1¼ inches; for fifteen-inch straight pipe, 1⅛ inches; for twelve-inch straight pipe, 1 inch; and for nine inch straight pipe, ⅞ of an inch, with a limit of variation not exceeding ⅛ of an inch either way, all made with butt joints, square and at right angles with the axis of the pipe, and each piece furnished with a "sleeve' or "ring," not less than four inches wide, whose internal diameter is not less than two inches greater than the external diameter of the pipe they are intended to encircle and join. The "curves," "slants" and "Y junctions" must conform to all the foregoing requirements as regards quality, form and workmanship, and their thickness be equal to that of the pipes of the same calibre into which they may be worked or jointed. All slant junctions are cut, and all the branch junctions molded for an angle of thirty-four degrees with the sewer with which they are to connect. One-fourth of all the straight pipe must be in two feet lengths. All the pipes are subject to inspection and approval or rejection of the commissioner of public works, or his duly authorized representatives, and equal in quality to the best pipe heretofore used in the construction of sewers in this city, and all rejected pipes, are, upon notice, removed from the line of work by the contractor.

CEMENT.

The cement must be fresh made, of some satisfactory and reliable brand, of such quality and uniformity as has been demonstrated by the department of public works to be of superior quality and thoroughly adapted to the construction of sewers and similar work, and approved by the commissioner of public works. It must be so finely ground that 80 per cent of the whole will pass through a sieve of eighty meshes to the lineal inch, and, when tested in the usual manner for tensile strength, shall give results comparing favorably with the best brands of American cement.

MORTAR.

The mortar must be made by careful measuring and thoroughly incorporating one part of cement with two parts of clean lake-shore sand in dry state, and mixed with clean water to the proper consistency, and must be used while fresh; the use of mortar which has been set and then retempered, is not allowed. In wet trenches, and when required by the engineer, the mortar used in building the invert is composed of equal parts of cement and sand mixed, and used as above specified.

CENTERING AND PATTERNS.

The centering patterns and templets necessary in the construction of the work, are furnished by the contractor, at his own expense, in accordance with plans and directions given. They are so made as not to yield under any pressure to which they may be subjected.

MASONRY.

All brick sewers two and one-half feet in diameter and less are built with one shell or ring of bricks; and all three feet in diameter and more with two rings, or shells, unless otherwise specified.

The bricks in each ring or shell of the invert are laid fair and true by line, and to the exact form of the sewer. In each course, of both the invert and arch, they are all stretchers, and break joints with those in the preceding course. The courses in the invert are carried successively through from end to end of the length in hand. In no case, in the invert, is the length laid in sections. Each brick is laid in a full bed of mortar, and all the joints filled by pressing the brick into the mortar; and never is the mortar worked in between the brick.

SANITARY ADMINISTRATION IN FOREIGN COUNTRIES—SWEDEN—II.

BY DR. FREDERICK EKLUND, STOCKHOLM.

The more immediate care for all that concerns the inspection of the public health in the kingdom, is accomplished by the local authorities. These duties belong (1), to the royal commanders, who shall have superintendence, and see that the persons concerned in the cities and in the country, accomplish their duties with respect to the care of the public health, and, moreover, perform what is directed concerning the different establishments for the care of the sick, and all sanitary measures generally, in which business the stewards and the bailiffs of the country districts and, in the towns, the bodies of the magistrates and the chambers of the police, will give them assistance; (2), to the provincial physicians, whose duties are to have inspection over the public sanitary conditions and to take care of the health of individuals; (3), to the communal committees in the country and the boards of health in the towns, which, however, have not, generally, any authority over the disposition for the conservation of the public health, but only have power to execute all that is necessary for the advancement of the general well-being; and (4) several persons, who may be appointed to practice some one or another limited part of the sanitary system, as for example the midwives, the vaccinators, etc. The activity, that belongs to the above-mentioned authorities, is, like that of most organs of administrations, twofold, partly to execute given orders, partly (to which kind of activity the inspecting authority may ever be accounted) to make their efforts certain of success, as, under circumstances, may be required, although the measures taken may not be distinctly recommended in the law. The first method of action may be arranged under two heads. As the sanitary means to prevent diseases are the most effective, the activity of the administration ought to be directed in the first place toward this purpose. Secondly, it ought to devote its care to the healing of the diseases, whose breaking out it could not prevent (Raberius).

I. Agencies for the prevention of diseases.

A. The abolition or removing of the causes of diseases.
1. General means and measures.
2. Agencies in special cases.
(a) Prohibition against premature marriages.
(b) Interdiction of conjugal state for persons afflicted by some diseases, as epilepsy, etc.
(c) Removal of pernicious external influences.
aa. The education of children.
1. Concerning nurses.
2. Straining beyond forces.
i. In the schools.
ii. Of young people under age in the manufactories.
bb. From unsuitable livelihoods.
cc. From unwholesome places for abodes.
dd. In the manufacturing of some products.
(d) Private agencies for the prevention of damage to life or health.

B. Measures for protection.
1. To prevent the importation of diseases into the kingdom.
a. Against the pestilence.
aa. Duty to enter in a quarantined place.
bb. The treatment at the quarantine station.
cc. The prescription of special measures.
b. Against the cholera and the yellow fever.
c. Against venereal infection.
2. To prevent the spreading of contagious diseases, that have broken out in the kingdom.
a. General means.
b. Measures against specific diseases.
aa. Against venereal disease.
bb. Arrangements to remove the receptivity for contagion.

II. Agencies for to heal the sick.

ON THE CARE OF PUBLIC HEALTH IN TOWNS.

The immediate inspection and the care of the public health in cities belong to a board of health, which is nominated for this purpose. This board consists of the master of the police, or, where such a person in office does not exist, of the member of the body of magistrates who is the chief of police of the city; of a member, whom the said body elects, from or without itself; of the medical officer of the town, or, where several such are in charge, of the first principal one among them, but where a medical officer is not appointed, of another physician, and also of four members, selected by the town deputies, or, where these do not exist, by the general council of the town. However in cities, where a master of police is not appointed, the number of the members, in conformity with the decree of the town deputies, or of the general council of the city, may be limited to five, viz., the member of the body of magistrates who is the chief of police of the city, the above-mentioned medical officer, and three members more elected by the commune. The members of the board of health are chosen for four years. The board of health shall devote its attention to all that may have influence upon the unwholesomeness and the general salubrity of the town, and earnestly try to effect improvements and maintain a satisfactory state of the sanitary conditions. To reach this end the board of health has the rights of sanitary police in the inspection over the town as to the care of the public health. The ordinances of the board of health in business that concerns the sanitary police, must, where they do not stop purely at advices and summons, but comprehend fixed injunctions, be brought to execution by the chief of the police.

SANITARY TEACHING IN SCHOOLS.

There is no class of people to whom there is a greater opportunity for disseminating the fundamental principles of health than the teachers in the public schools. It is to them that the child owes his first ideas of the vast world outside the four walls of its infant play-house. The mind of the child, like the sand of the moulder, can be built up in the finest and most delicate tracery of artistic conception, or in the gross and hideous ideal of the sensuous and unregenerate. During this plastic period a law of life-lengthening learned will be longer remembered and more implicitly obeyed, than the same law heard from the lips of the preacher or read from the tract of the health board. The teachers must be interested in the work. Our sanitarians neglect this field too much.

THE SEWERAGE OF NAHANT.—IV.—Concluded.

BY E. W. BOWDITCH, C. E.

The first of the cisterns was tested first in Jan., 1882:

K.

Free ammonia	0.0098
Albuminoid ammonia	0.0178
Chlorine	2.80
Fixed residue	56 30
Volatile "	4 60
Total "	60.90
Hardness	30°

In February:

L.

Free ammonia	0.0013
Albuminoid ammonia	0.0088
Chlorine	1.60
Fixed residue	8.30
Volatile "	1.40
Total "	9.70
Hardness	3°

In April:

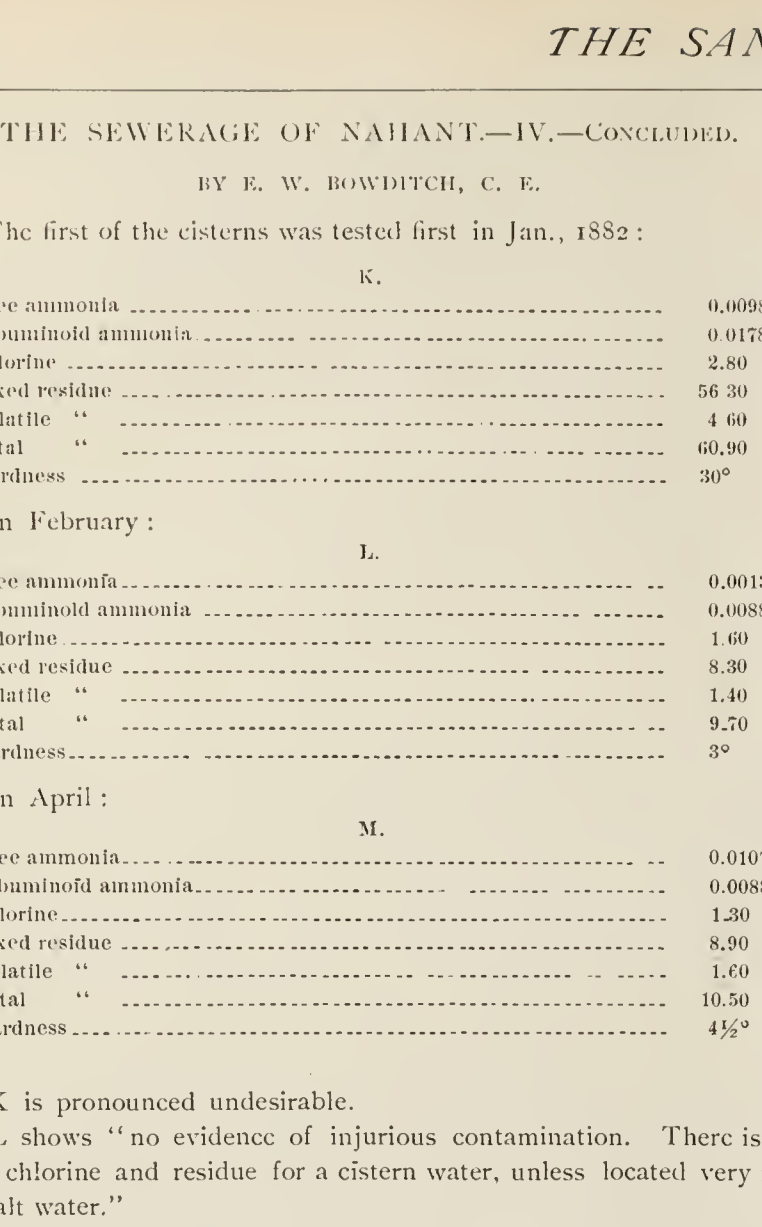
M.

Free ammonia	0.0107
Albuminoid ammonia	0.0088
Chlorine	1.30
Fixed residue	8.90
Volatile "	1.60
Total "	10.50
Hardness	4½°

K is pronounced undesirable.

L shows "no evidence of injurious contamination. There is too much chlorine and residue for a cistern water, unless located very near the salt water."

M is "slightly suspicious on account of the free ammonia, and if a cistern water, of the chlorine and residue."



SECTION AND PLAN OF GREASE-TRAP.

Water from the second of the cisterns was used at a house where fatal cases of typhoid fever had occurred. Sample taken early in January, 1882.

N.

Free ammonia	0 0193
Albuminoid ammonia	0.0144
Chlorine	0.90
Fixed residue	3.60
Volatile "	1.10
Total "	4.70
Hardness	1½°

The next one taken in May, 1882 (after heavy rains):

O.

Free ammonia	0.0152
Albuminoid ammonia	0.0098
Chlorine	1.70
Fixed residue	3.30
Volatile "	2.90
Total "	6.20
Hardness	1°

The comments on the first one, N, are "Probably a cistern water, and a very suspicious one on account of the very large amount of free ammonia, together with the large amount of chlorine. The albuminoid is about the extreme limit."

On O the report is, "Without knowing anything about the surroundings of this water, I should pronounce it suspicious or even bad, but I think fresh rainwater, collected about the beginning of an easterly storm at Nahant, might have this composition." (The sample *was* collected just after a heavy easterly storm.)

The third instance is a cistern, the water from which was used in a house where very severe typhoid occurred. The first sample was taken just before the first of November, 1881.

P.

Free ammonia	0.0195
Albuminoid ammonia	0.0530
Chlorine	0.7
Fixed residue	11.00
Volatile "	10.00
Total "	21.00
Hardness	—

And a fortnight later:

Q.

Free ammonia	0.0750
Albuminoid ammonia	0.0085
Chlorine	.20
Fixed residue	3.00
Volatile "	2.00
Total "	5.00
Hardness	—

P is pronounced "foul and unfit for use on account of its large charge of carbonaceous or vegetable organic matters. * * * It should be called highly dangerous."

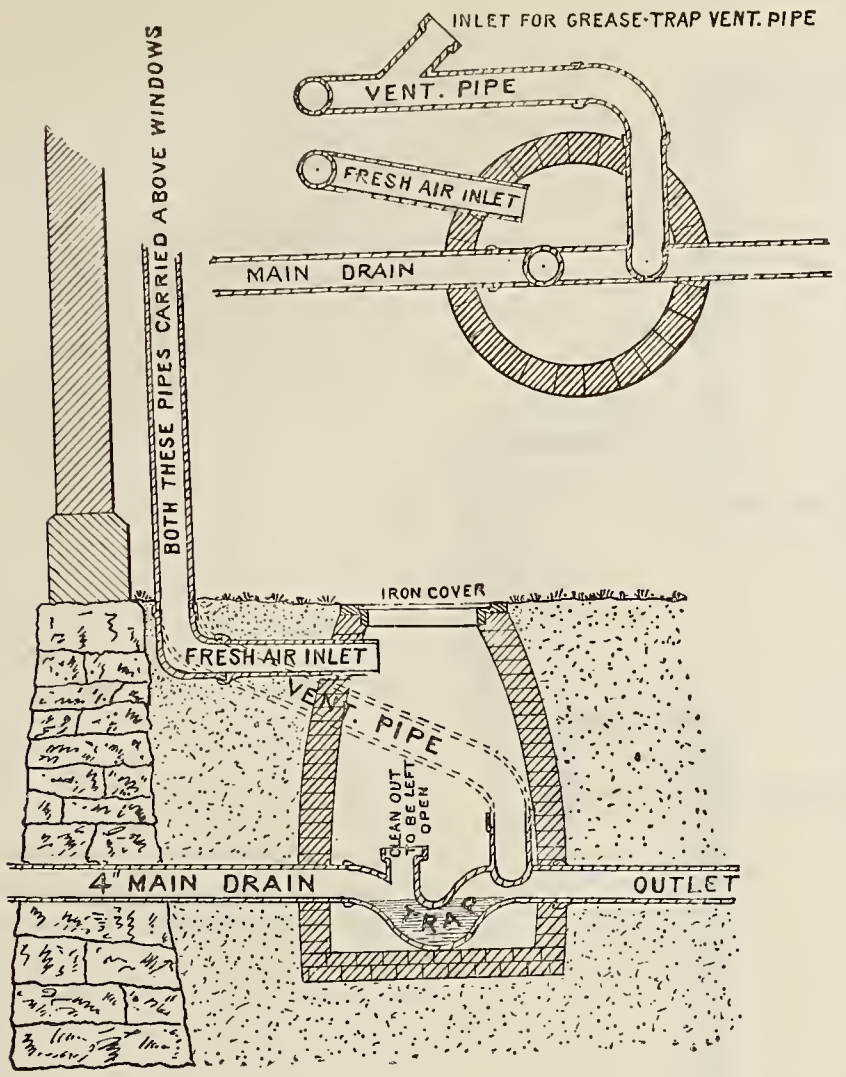
Q: "This water is from a sound and clean cistern. The proportion of free ammonia is high * * * and may be accounted for by the entry of recent heavy rains into the cistern, or by the condensation of ammoniacal vapors on the roof from neighboring flues. A satisfactory water."

While the conclusions, as to soil recovery, may be derived from insufficient premises, perhaps calling attention to the subject may lead to a discovery of facts warranting systematic search in this direction that may be of great sanitary value.

Ground was broken for the sewers Feb. 16, 1882, and all work on them was finished July, 1882, although some of the private connections were not done until after that date.

The estimated cost of the work was $52,000; the actual cost, including a number of items not originally estimated upon, was $51,785.77.

The question has been frequently asked, "With the knowledge gained from the work done, what changes would be advised, was it to be repeated elsewhere?" A difficult question to answer, as no two places are similarly situated, either geographically, sanitarily, financially, or any other way. It may be sufficient to say, that some of the details of the



SECTION AND PLAN SHOWING TRAP, VENTILATING PIPE, ETC.

house connections, such as grease-traps, cesspools (Figs. 10, 11, and 12), and fresh-air inlets, would probably be somewhat differently arranged, and the former built of cast-iron rather than brick, while the general features of the plan would remain unchanged.

THE SANITARY CONDITION OF THE NEW KEITH SCHOOL.

In accordance with a long-premeditated plan, and in obedience to the expressed wish of many interested readers, THE SANITARY NEWS commences, with this article, a series of descriptions of the principal school-buildings of Chicago, as regards their sanitary construction in the case of new buildings, and sanitary condition in the case of old buildings. It will be the aim to make this series of interest to more than the citizens of Chicago. It will prove of importance to every one who is interested, in the slightest degree, either in school hygiene, school-house construction, or general sanitary building, all of whom will find material for thought and consideration in these articles.

The first school examined by the representative of THE SANITARY NEWS was the new building known as the Keith school, located on Dearborn and Thirty-fourth streets, in the South Division. It was begun in the spring of 1883, and was first occupied January 7, 1884. It is a large brick structure, containing about fourteen rooms. It has a large, light and airy basement, in which are the water-closets, furnaces, etc. The halls are large, and are very light and cheerful. The closets are similar in construction to those described on page 50 of THE SANITARY NEWS, in the present volume. There was no odor in the closet whatever. The buildings are heated by Ruttan furnaces, there being large fresh air chambers in the rear of each furnace. The air-openings of these chambers are protected with a patent gate, which, to a certain degree, regulates the current, and, on cold, gusty days, keeps the temperature of the air supplied by the furnaces more even. The fresh air is carried to the different floors in large flues, so arranged as to permit the warm-air supply to be shut off, allowing cold air to enter the room. There is, at the present time, an order in force that all new buildings shall be heated by furnaces. While, for many reasons, steam-heating is usually to be preferred to furnace-heating, for a school-house, heated but six or seven hours of the day and but five days of the week, there is needed some method by which heat may be rapidly generated and the apparatus left in cold weather without danger of bursting, etc. The tendency in furnace-heating is, however, to have too few furnaces, and rush them to their utmost capacity, thus baking and devitalizing the fresh-air supply. It is better to use more furnaces, keeping up a more moderate temperature, and supplying more air.

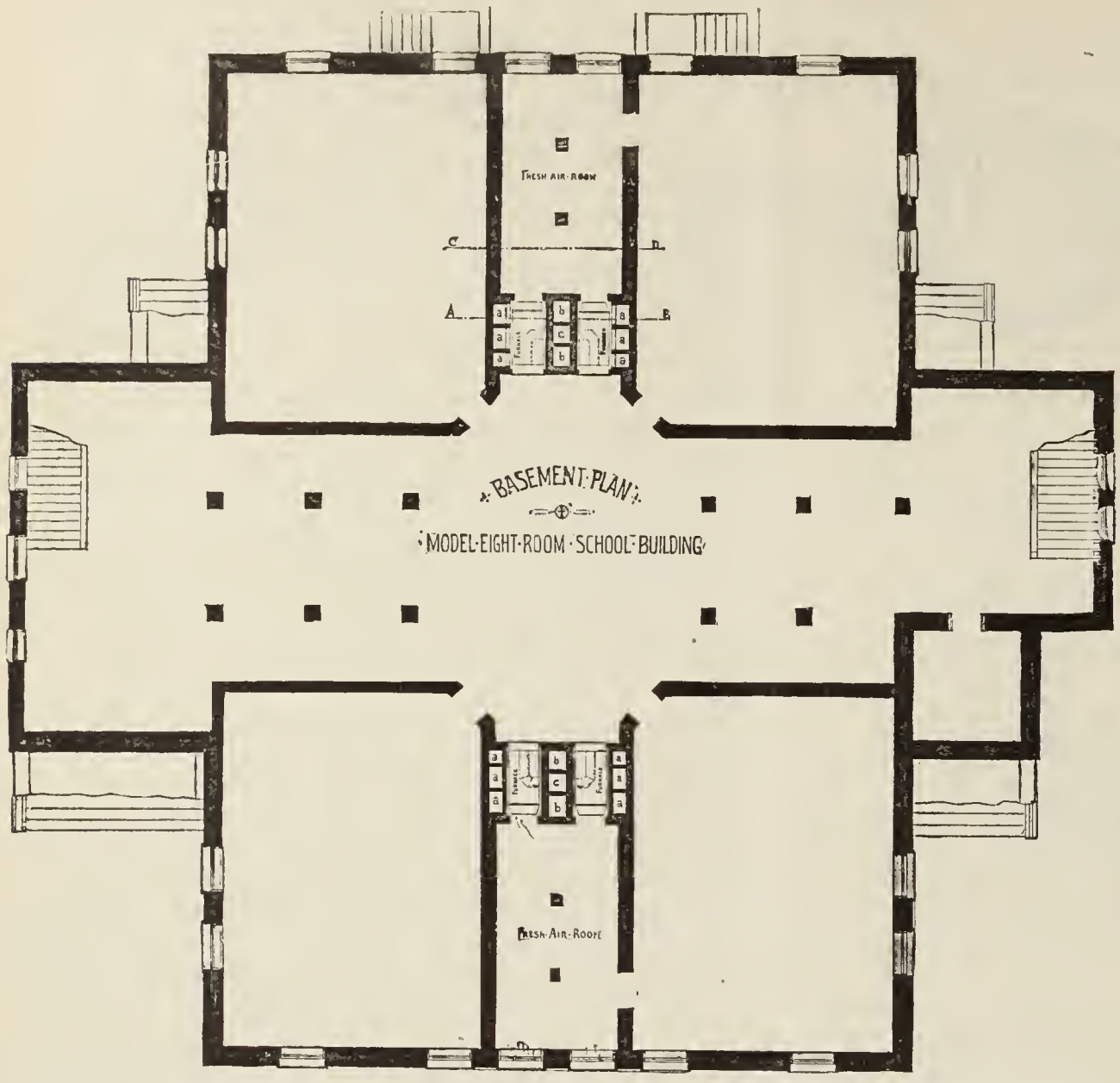
The tests of temperature and ventilation were made in two northwest-corner rooms, the wind at the time blowing from the west. Room No. 4 was in the third (upper) story, and contained fifty-four scholars, averaging twelve years of age. The room is 28x34x13 feet in size, containing 12,376 cubic feet. The air is introduced into the room through a flue, having its opening eight feet above the floor. The architect believes in having the air introduced at this height, because, if at the floor-level, some one or more desks would be located directly in the current of hot air, which would certainly be harmful to the pupils. Then, too, as the air has to rise to the top of the room, he thinks it is better to send it out in a fan shape near the ceiling, believing it will fall to the floor in more even sheets or layers of air, than if it was brought in at the floor-level at one side of the room, or directly through the floor in the center. If the air is brought in directly under the ceiling, he thinks it will cling to it and the opposite side wall, not falling evenly, and that there is a tendency to check new walls, by bringing hot air directly against them. The foul air is removed from each room by three flues, in three corners of the room, having a separate channel through the roof to the outer air, and having no connection with any other flue whatever. These flues are not heated.

As to temperature, the experiments consisted of exposing twenty-five Fahrenheit's thermometers at different locations for thirty minutes. The temperature of the fresh-air supply in the flue was 108°. Thermometers were placed at the top of the blackboard (about seven feet from the floor), on the desk, and on the floor in each corner of the room, and, so far as possible, in the same relative positions on the sides of the room. Seven thermometers at the top of the blackboard showed a range of temperature from 70° to 78°, the average being 74°. Six thermometers on the tops of the desks showed a range of temperature from 62° to 70°, the average being 67½°. Five thermometers at the floor level showed 60°, 63°, and 62° temperature, an average of 62°. This revealed a difference of 12° between the average temperature at the floor and at seven feet from the floor. The foul-air flues are placed a few inches from the floor; the temperature of the out-going air was 66°. The children were not exposed to a lake of cold air around the feet, though it would be better if the foul-air flues opened directly at the floor-level. The outside temperature, during these experiments, was 24°. The three foul-air flues were ten by fifteen inches in size. The flow of air through the one tested was 28,070 feet an hour. Three flues would carry out 84,210 cubic feet of air each hour. The air of the room is changed over 6.8 times each hour. The room is lighted by four windows at the left of the pupil, and two at the rear end in the corners, which were closed by blinds at the time of the visit. The room having a northern exposure, was cheerfully light.

In room No. 14, the tests for temperature and ventilation were similar to those described, and the results were as follows: Eight thermometers at seven feet from the floor ranged from 67° to 74°, having an average of 69⅝°; six thermometers at the desk-level, showed a range of temperature from 62° to 67°, having an average of 64½°; six thermometers at the floor-level showed a range of temperature from 60° to 64°, the average being 61°. The temperature of the hot-air flue was 110°, and the outside temperature was 22°. The flow of air out of the foul-air flue tested was 22,812 feet an hour; at this rate, the three flues would carry 67,836 cubic feet of air out each hour, changing the air of the room 5.47 times each hour. This room contained thirty-six pupils, aged about six years. The supply of air for each pupil was 1,884 cubic feet per hour, or within one hundred and sixteen feet of Parkes' standard. This room is lighted the same as the other. The temperature of the out-going air was 60°. It will be seen that the average temperature of the lower room was about 4° lower than that of the upper room. In buildings heated by furnaces, the constant tendency is for the long flues to rob the shorter flues.

Dr. W. H. Watkins, of New Orleans, recommends that a committee of the auxiliary sanitary association confer with the board of directors of the public schools to advocate the introduction of hygiene into the schools.

One hundred incandescent electric lights, which are the first in the city, have been placed in the Howard oil works at Houston, Texas.



Heating and Ventilation designed by Ruttan Mnfg. Co., Chicago.

FIG. I.—BASEMENT.

Presented by Edbrooke & Burnham, Architects, Chicago.

MODEL EIGHT-ROOM SCHOOL BUILDING.—I.

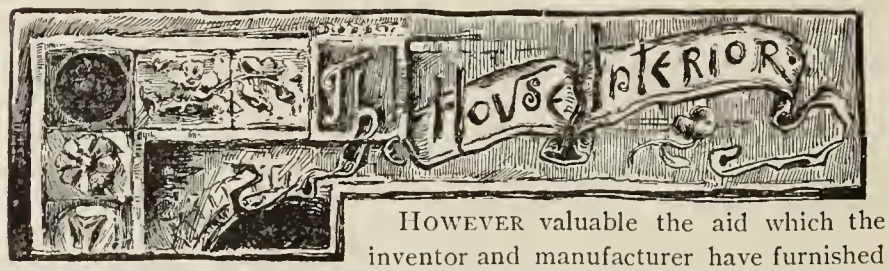
The first two of a series of illustrations of a model eight-room school building are given on this and the following page. They represent, not only the plans, as to arrangement and proportions, but the heating and ventilation by the Ruttan system, now quite extensively introduced. The plans are nearly self-explanatory, and it only remains to say a word about the heating and ventilation.

The furnaces are arranged, as shown in the basement plan, two on either side of the corridor. The air from the outside is received in fresh air rooms before reaching the furnaces, and, when heated, passes upward through flues, **aa**, to the rooms above. The manner in which the supply is regulated is shown in a sectional drawing, which will be reproduced in the next issue of THE SANITARY NEWS. These flues are so arranged, in the central portion of the building, that the school-rooms are warmed directly from them; there is no running of horizontal pipes. The warm air passes into the rooms through registers, as at **a**, Fig. 2, at or near the floor, as will be more clearly shown in a succeeding figure, and leaves the room when partially cooled and vitiated by breathing through foul-air flues usually placed beneath the windows, as shown in Fig. 2. The floor is so laid that the foul air, which has lost only a portion of its heat, has free communication, directly under the floor, to the foul-air shafts. The heat in the air, after it has become useless for breathing purposes, is thus utilized in helping to keep the floors warm. The temperature throughout the room can thus be made and kept more equable. The letter **c** represents the smoke-stack of the furnace, on either side of which is a foul-air shaft, **b**, kept warm by the chimney, or made so, artificially, if required. It will thus be seen that a complete circulation of air can be kept up throughout the rooms, whether warm or cold, in winter or summer. The floors of two rooms in Fig. 2 are represented as partially cut away to show the movement of the foul-air.

Illustrations of the plan of the second story, showing more of the details, and a sectional view of the heating and ventilating apparatus will be given in the next issue.

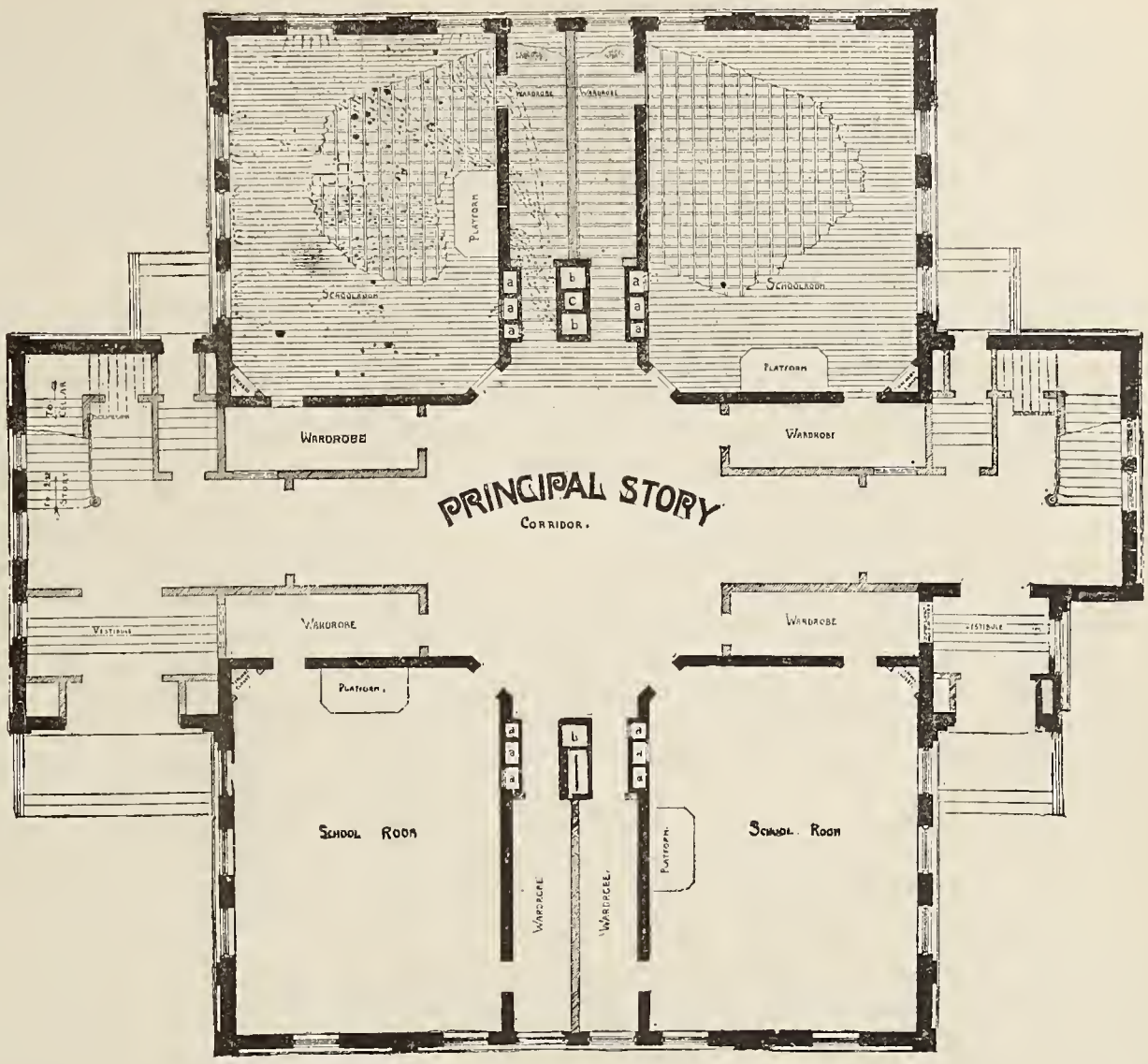
THE MEMPHIS SEWERS.

Rudolph Hering, C. E., in a recently-published letter concerning the Memphis sewers, states that Col. Waring's patented claims, which, it is commonly supposed, are represented by the Memphis system, consist in the main of a combination of the following four elements: Absolute exclusion of all rainwater, ventilation of street sewers through house pipes, automatic flush-tanks at the upper end of every sewer, and drain tiles for sub-soil drainage laid in the same trench with the sewers. He also states that, in spite of the regulations, the storm-water has been turned into the pipes to such an extent as to increase their flow so much as to compel, for their relief, the construction of special overflows from the sewers into the creek or bayou, which is a common custom in England. He also states that stoppages have occurred to such an extent as to make it necessary to build man-holes every few hundred feet, which Col. Waring pronounced unnecessary. "In two cases," he states, "it was necessary to construct catch-basins to prevent a constant silting-up of the sewers from the washing of certain stables." These changes, Mr. Hering adds, are sufficient to stamp the Memphis works as no longer a type of the patented "Waring system." He also does not think it desirable to rely on flush-tanks entirely, and thinks, as one man's time is wholly employed to inspect and keep in order the 184 tanks in Memphis, he might as well allow the end man-holes to fill with water, and flush the sewer by drawing a plug. While Mr. Hering thinks the system works as well as could be expected, it "is yet no better than it would have been, had it received its true name at once, and from the start been built in exact conformity with English practice;" and he thinks that the successful working of the system is due to the abandonment of the novel features, and the careful supervision of the local engineers.



HOWEVER valuable the aid which the inventor and manufacturer have furnished the housewife in the working department of the home, she has still an important work to do in this direction, and her knowledge of ways and means should make her competent in superintending the arrangement of this most necessary part of her establishment. A well-informed woman, with the assistance of an intelligent, working carpenter, can often accomplish more practical results than a dozen theorists with the most elaborately-drawn plans. A competent writer says: "In large cities it is hardly ever possible to get at the workman; there is always some very smiling and obliging shopman between us and the worker, the person whom I, for one, the most want to see. It is a great pity that those who can give intelligible instructions and designs should not insist on seeing in the flesh the very person who is to carry them out." That this is practical common-sense has been abundantly proved. In the house of Mr. J N. Jewett, of this city, there is a pantry, built under the personal direction of Mrs. Jewett, which would satisfy the most exacting housewife. Its two doors swing noiselessly into place, so that the annoyance of slamming is impossible. On one side is a deep closet built out into

the room. It has glass sliding doors, and is amply furnished with shelves, and brass hooks in the wall between the shelves, so that a quantity of delicate glass and china may be conveniently arranged without danger of breakage from piling up, or crowding. On either side of this closet are small compartments, one, with wooden bars set at different heights, for soiled napkins, which are hung here until washing-day, instead of being thrown damp into a bag or basket, and a similar closet below for soiled dish-towels. The other side compartments are for brooms, brushes, and step-ladder. On the opposite side of the room is a copper sink for washing china and glass, the table on each side being covered with copper. This is a great improvement over the marble table, which is usually found in a butler's pantry, as the softer surface of the metal renders the fragile ware placed upon it to drain less liable to receive nicks and cracks, than the harder stone. On the left of this sink is a slop-sink, with a large waste-pipe, to receive waste water, and, below, there are shelves for towels, hidden by a chintz curtain. A large window over the sink gives abundant light and air. The third side of the room is occupied by three tiers of closets with sliding doors. Each tier is in three compartments, and between the lower and middle closets are sliding tables which can be easily drawn out. The upper tier utilizes the space to the ceiling and gives room for storing articles rarely used. The fourth side has space for dumb-waiter and ice-box, with closets above. With less care and thought in the planning, much of the space, which is so advantageously used, and which makes this room so complete and convenient, would have gone to waste. There are comparatively few houses, except those built for the owner's occupancy, where such a large space can be given to the butler's pantry, but many of the conveniences which this room suggests may be adapted to the needs of the ordinary house. Let the housekeeper, even if her means and space are limited, regard her work as an art to be developed and elevated by her own thought and effort, and for her own satisfaction, as well as for the health and comfort of her family, and she will not grudge the additional time and expense which she gives to the attainment of the best means for carrying out her work, even if, by so doing, she falls behind her neighbors in the number and variety of objects of art and odd pieces of furniture which make up the heterogeneous confusion of the fashionable drawing-room.



Heating and Ventilation designed by Ruttan Mnfg. Co., Chicago.

FIG 2.—PRINCIPAL STORY.

Presented by Edbrooke & Burnham, Architects, Chicago.

* * *

In the same house is a little room raised one step above the library, from which it is separated only by Oriental hangings, in which the Moorish idea is constantly carried out. It is lighted by a painted glass window, which fills the ceiling space. Below this window is a frieze of light wood carved in a geometrical Moorish design. The walls and soft carpet show a similar Oriental pattern, and broad divans, with many soft pillows, extend around three sides of the room. The wall space on one side is filled by a genuine Cairo lattice window, brought here after a service of two hundred years in the picturesque Egyptian city. The latticed panels in the center of the window swing outward, and the whole work is carefully cut, its spindles, circles and squares being as perfect as they were two centuries ago. The cedar wood of which the window is made is dark with age, but still retains its delicate spicy fragrance. The window looks upon the broad landing of the stairs, where another luxurious divan is placed.

Embroidered bedspreads and round bolsters are quite indispensable in an artistic bedchamber. Some of these spreads are very sumptuous and expensive, both in material and decoration. Silk sheeting and serge are the fabrics most used, or, if a thin fabric is preferred, the fine white Bulgarian cloth is the most desirable. The latter material may be lined with silk of a color in accord with its embroidered decoration, if a delicate tint is desired. The spreads of silk sheetings are ornamented with applied or crewel work, and are finished with a wide band of plush on three sides. Oriental designs, or conventional floral forms, are the most appropriate decorations. For cheaper spreads, cretonne is used with good effect. The white spreads, with square linen pillow shams, is becoming a thing of the past.

* * *

A very pretty small rug may be made of a breadth of ingrain carpet in a solid color. It should be fringed at the ends, and ornamented with a bold and simple design worked in crewels. An arrangement of discs and circles can be made very effective. A rug recently finished at Misses Evans' and Hardy's decorative rooms, is of plain peacock blue ingrain with a branch of apple blossoms thrown across it. Another of the same color has a decoration of oak branches and acorns, and an olive rug is embroidered with sprays of clematis. At the same rooms are some dainty doylies of fine linen, each having a spray of flowers in one corner, with an appropriate poetical quotation delicately worked in colored silks. Another set, which includes a small tray napkin, has apt selections from Shakspeare.

* * *

Wherever it is possible, the woodwork of a room should be of hard wood showing its natural grain and color. Where pine is used, it should be painted in quiet tones, in harmony with the furnishings of the room. Graining is neither artistic nor satisfactory. If, as is usually the case, it is poorly done, it becomes a continual annoyance.

Martha Howe-Davidson.

GOTHAM PLUMBING NOTES.

New York, Jan. 31, 1884. — Special Correspondence of The Sanitary News: — A city is never finished. The great, red brick, produce exchange building, with its massive, square tower, near the South ferry, overlooks the Bowling Green, where Peter Stuyvesant and Wouter Van Twiller smoked their pipes when the city was known as Nieu Amsterdam, and stands proudly in this, the oldest, part of the town, in company with a number of huge buildings recently constructed. The entire island of Manhattan was originally sold for $26 ; the plumbing of the exchange, now being done by the old established firm of Ensaever & Son, will cost in the neighborhood of $50,000. Old New York is being constantly rebuilt. David Hennessy, of honorable fame, has been plumbing a large structure at Fulton and Dutch streets. Locke & Monroe are fitting up a five-story building, at the intersection of South Fifth avenue and Houston street, for the celebrated steam-heating concern of Baker & Smith. S. & A. Clark are inserting the water arteries and gas veins in two buildings at Green and Spring streets.

Marvin & Hilton, of avenue C, are plumbing a new building on the north side of Union Square. Their work, done some time since, in Oxley & Giddings' chandelier-factory, which occupies the triangle formed by Center, Walker and Canal streets, will bear inspection. Mr. Marvin is a handsome man, of joyful mood, and his partner, Jack Hilton, thoroughly understands his trade. Twenty-five years ago he carried on a large business in Cohoes, N. Y.,— all the monster mills there being fitted up by him.

The Gorham manufacturing company have erected a noble brick edifice on Broadway, at the corner of Nineteenth street. The water and gas work has been done by Messrs. Mead & Rossman, one of the leading firms, in their line, in the metropolis. They do not seek notoriety, either cheap or dear, but have a standing, solid and substantial, and an enviable name, acquired by veteran service in the cause of hygiene and sanitation. Both are thorough masters of their business. Mr. George H. Mead is a man of clarified ideas. He is a keen observer, and impresses one as a man who is never befogged, or of doubtful mind. Should this chance to meet his eye, he will mentally consign the gossippy writer to the limbo of unwarrantable liberty-takers ; but the truth will stand. Mead & Rossman are doing the work in the three storehouses under that number of arches of the New York approach to the Brooklyn bridge. The red brick of these structures contrasts well with the gray stone of the bridge. The sewer connections are made a little out of the ordinary way, the waste-pipes being brought down alongside the bridge and laid parallel to it, while at every few feet a branch dodges into the sewer. These warehouses are remarkable for their solid and peculiar roofs and sides. They look as though they had been slid into the under-bridge spaces with the same surety of staying undisturbed, as some of the indictments in the pigeon-holes of the district attorney's office.

Mr. Albert Gray, who employs, in busy seasons, about 125 men, has been responsible for the plumbing and steam-fitting of the bridge since its commencement. Few men are better, or more favorably, known down town than Mr. Gray. He is now overhauling two houses on Fifth avenue,—Vanderbilt's, before he moved into his present quarters. James Nugent, of Grand street, is doing a thriving business, and his work is of first-rate quality. John Renehan, of Thirty-fifth street, does much good plumbing, and is just now very busy. Harkness Boyd has a number of large contracts on hand. This is a chronic condition with him,—when one thing winds up, another begins to unravel. James Philip, of Broadway and Fifty-second street, has some "pretty sizable" jobs under way. The site of the old post-office is occupied by the new Mutual Life insurance building ; Alex. Henderson has been the presiding genius of the plumbing, and has reached the last stages of his work. F. A. Shields, of Crosby street, has just finished overhauling a building in Wall street. Mr. Shields has the entire plumbing work to do for the New York fire department, including some sixty engine-houses. The residence of Cardinal McCloskey was supplied with water, etc., by Mr. Shields. Wm. Young & Bro. are doing considerable work. The largest, or, at least, one of the largest, dwellings of modern times, the Dakota apartment house, on the west side of Central Park, has occupied the time of Mr. Timothy Brien, of Bleecker street, for a year or two, and the plumbing is not yet in a finished state.

The retiring president of the New York master plumbers' association, Col. Geo. D. Scott, is a very popular man, and during his *régime* he gave thorough satisfaction. Col. Scott has done more for the association of master plumbers than it could ever repay him, and his record is untarnished. He remains, of course, president of the national plumbers' association. His successor, Mr. J. A. McDonald, is one of the most active and enterprising men in the trade. He is widely known and universally esteemed, and has been the champion of many a good cause in the interest of the craft. Harmony prevails in the association, and the various objects of its existence, educational and otherwise, will doubtless be forwarded with unabated vigor. "X."

New York, Jan. 14, 1884.—To the Editor of The Sanitary News :—The more I study and reflect upon the science of correct plumbing, from the thoroughly practical and experienced standpoint, the more I am convinced of the importance it must assume as a conservator of the health of the public. It has as close and intimate connection with the well-being of the individual as the family physician. I do not wish to be understood as saying that all the ills flesh is heir to come from bad plumbing, nor that good plumbing will prevent some forms of sickness ; but statistics show that there are a number of preventable diseases which can be traced to bad plumbing, and ignorance of ordinary sanitary regulations. As true craftsmen the responsibility of prevention rests upon us. Aided by the highest scientific research, it belongs to us to advance the plumber's art, until it secures the consideration to which it is entitled.

This introduction leads me to the subject which I wish to discuss— the organization and incorporation of master plumbers' associations. I am of the most decided opinion that incorporation is a step in the right direction. I have spoken of it to our association here. It is more than to be desired ; it is an imperative duty. By state organization we can retain control of the business which rightfully belongs to us. That there are others ready and willing to organize and reap the benefits which would accrue, is shown by the fact that a great number of nondescripts and theorists have fastened themselves on plumbers' work, as barnacles to a ship. By organization we can best secure to the people healthy homes and overcome their apprehensions. The New York association hopes, by unity of action, to accomplish much in the line of elevating its members and promoting the interests of our trade and profession throughout the empire state. In this we will, at least, emulate the Chicago association in its really beneficial work. We are dealing with several questions here at present, and we will certainly overcome the many difficulties with which we have to contend, if we are true to ourselves.

Pardon this lengthy communication. As secretary of our association this year, I will have the opportunity to furnish news to your most excellent and thoroughly wide-awake paper. I remain, very respectfully yours, Alexander Low.

EARLY SANITARY CONDITIONS OF CHICAGO.

To the Editor of The Sanitary News :—The issue of The Sanitary News for Jan. 1 has been of great interest to me. It is certainly a paper worthy to grace the library-shelves of the investigating scientist. I was particularly interested in the article written by Mr. David Whiteford, entitled, "Plumbing of To-day as Compared with That of the Past."

I might say a word about Chicago at an early date, beginning with the time when it was a mere village. Back in the forties, when plumbing and drainage were but indifferently understood, various devices were adopted. The streets were rounded up in the center, leaving shallow ditches on each side, which emptied their surplus water into the river, or low-lying places. The latter became virtual cesspools, which, under the influence of the sun, bred disease and pestilence. The water-supply was taken from wells sunk on individual premises, or on vacant lots,— sometimes in the streets. Dish-water, wash-water and all fluid refuse from the kitchen were generally thrown on the ground in back yards. In time, the water drawn from the wells began to taste,—a little brackish at first, then saltish, and finally it had a perceptible odor, which ultimately became offensive. A well, at length, had the odorous characteristics of a privy-vault. When it rained, the water in well and privy-vault rose correspondingly ; unless the prudent householder "banked" the latter, it often overflowed.

The disuse of wells brought into existence a new enterprise,— that of hauling water from the lake and selling it. A hogshead, mounted on an axle between two wheels, and drawn by a horse, was first used. The

only opening was a hole at the top, sufficiently large to admit a pail. The vehicle was backed into the lake until the water came conveniently near the top, when the hogshead was filled by the use of pails. The driver then proceeded up the street, mounted on a cross-piece in front of the hogshead, and served those who hailed him with water at a shilling per barrel. The use of the pail in emptying was finally superseded by a hose tacked around a hole about four inches in diameter, near the bottom. At length, contracts were made, and many families were supplied on certain days of each week, or every other week.

When Chicago became a city, water-works were established just south of the south pier. Although primitive, they answered the purpose for which they were intended very well. I think the mains were originally of wood, and were tapped by lead pipes. At times they would fail, when the water-carriers would have a harvest. As the system was extended, iron mains were laid along the principal streets. Various devices were tried; some failed, others succeeded; on the whole, the people of the Garden City made very little complaint.

The sewerage system was faulty in the extreme. The first sewers were made of two-inch plank, one foot wide, fastened together with heavy spikes. Sometimes the sewers would clog, the water in the river and lake rising in the tides and forcing solid matter back. Much filth entered the sewers through illy-devised traps. The ineffective system not only led to a great expenditure of money in tearing up streets for cleaning and making repairs, but caused great annoyance. Then there was the stench! The escaping sewer-gas caused diseases of a serious nature, culminating in cholera, which threatened to depopulate the city. All these troubles helped to wake up and bring into activity the thought and enterprise of Chicago engineers and plumbers, and the result is now apparent. Chicago enjoys the reputation of having splendid systems of water-supply and sewerage.

DR. A. S. MARTIN.

Texas, Mich., Jan. 25, 1884.

SOIL-PIPE MATERIAL.

CHICAGO, Jan. 19, 1884.—TO THE EDITOR OF THE SANITARY NEWS:—In your issue of Jan. 15, "H. C.," on reading my paper on "Plumbing of To-day, as Compared with That of the Past," finds some statements I have made from which he begs leave to differ. I am glad some one has taken up the subject of lead versus cast-iron soil-pipe, because I believe it is a very important question, and one for and against which much can be said. It is by getting the varying experiences and opinions of others, who have been brought directly in contact with the uses and abuses of the material used in the plumbing business, that we are enabled to arrive at facts.

In the first place, I will say that the lead soil-pipe I had reference to was the light, lead pipe, weighing five pounds per lineal foot, and not the heavy, lead soil-pipe, weighing eight or ten pounds per lineal foot. I have not the least doubt but that what he says may be true in regard to the durability of the lead soil-pipe of which he speaks. In order to determine the condition of a soil-pipe of any kind, it would have to be taken down and cut in pieces, to see what substance was left in the metal. I think my fellow-craftsman's view of putting up lead soil-pipe a good one; but he makes a great mistake when he thinks it would be a difficult thing to find enough plumbers at the present time to run up a stack of four or five-inch lead soil-pipe, because of the size of the joints. The truth is, speaking for myself, that largeness of the joints cuts no figure at all. Believe me, I can make a four or six-inch joint, as can any of the men I have taught, up to within the past few years.

Permit me to say that to ask a plumber to see that a carpenter cannot drive nails into his soil-pipe is asking far too much. It appears to me that your correspondent has the impression that all soil-pipes are put in a recess and boxed in. Where you find one put up in that way, you will find twenty plastered in parlor, and other, partitions. I have seen both picture-nails and bell-wires run right through a lead soil-pipe; I consider this a great deal worse than what "H. C." saw in Rochester.

Is cast-iron soil-pipe better than lead? I claim it is, not alone for the reasons already given in my paper. Although I cannot show you an iron soil-pipe put in forty years ago, in as good condition as on the day it was put in, as your correspondent can with reference to lead, I can show you an iron soil-pipe, one-eighth of an inch thick, that has been in use twelve years, and is in as good a condition, apparently, as on the day it was put in place. If a cast-iron soil-pipe one-eighth of an inch thick lasts twelve years, in good condition, how long ought a cast-iron soil-pipe one-half of an inch thick to last? Another reason I would give in support of iron is that iron, one-half of an inch thick, will cost 20 per cent less than lead three-sixteenths of an inch thick. I have no fear that iron soil-pipe, properly supported by iron rests, or bands, under every joint, will break or become disjointed. Are we going backward instead of forward? Are our sanitarians and health commissioners all wrong in regard to iron soil-pipe, that they should recommend it? Why do we, as practical men, submit to it? I believe in using cast-iron soil-pipe; the health of the people is better assured than with lead.

A word about water-closets. In giving my idea as to the way they ought to be made, I did not mean to condemn the valve, but the closet as a whole. A closet, in my estimation, ought to have no parts about it that the water cannot reach and wash out clean. I claim that the only way to do this is to have a tank, removed from the closet with a large flush, thoroughly cleansing the glass bowl at every discharge. Yours very truly,

DAVID WHITEFORD.

CURRENT PUBLICATIONS.

FOOD AND DRINK FOR INVALIDS.

Now that a reasonable dietary is considered of so much benefit in most cases of illness, Dr. A. W. Nicholson, of Lansing, Mich., has published a little pamphlet, by the aid of which, the physician may prescribe just the food he thinks advisable and be quite certain it will be properly prepared. The pamphlet has but four pages, but contains recipes for preparing twenty-nine food and invalid preparations, and has blanks for designating for whom the food is to be prepared, and the name of the physician. It is designed to leave the pamphlet with the nurse or family. The pamphlets are sold at $1.00 a hundred, and Dr. Nicholson will send a sample copy to any one enclosing a stamp for the purpose.

DRAINAGE AND SEWERAGE OF DWELLINGS.

Wm. Paul Gerhard, the well-known civil and sanitary engineer, is the author of a book just issued from the press of William T. Comstock, bearing the title, "Hints on the Drainage and Sewerage of Dwellings." The book is the compilation of a series of articles on the subject which Mr. Gerhard has been contributing to *Building* under the assumed name of "Hippocrates." The scope of the book is the same, with more comprehensiveness, as the work by the same author on "House Drainage and Sanitary Plumbing." It is profusely illustrated with cuts intended to represent proper and improper methods of performing plumbing work, and with illustrations of most of the patented sanitary appliances. The illustrations (save of the patented appliances) are almost uniformly poor, and the subject matter demands better engravings. This is especially true in a work where sight is called upon to educate mind, as is the case in illustrations of sanitary or unsanitary conditions. The work invites particular attention to the Durham system of house drainage, as might be expected from the author's well known views; at the same time he is unprejudiced. The publisher has clothed the book in a delightfully cheerful and attractive dress, which, in part, makes reparation for the poor illustrations. The book is a valuable one for those who desire to become acquainted with the present systems of practice in American plumbing and house drainage.

PUBLICATIONS RECEIVED.

"Hints on the Drainage and Sewerage of Dwellings." By Wm. Paul Gerhard, Civil Engineer. New York: William T. Comstock, 6 Astor Place, 1884. Pp. 302. Illustrations, 282. Price, $2.50.

"A Bachelor's Talks about Married Life and Things Adjacent." By William Aikman, D.D., author of "Life at Home," etc. 12mo, Pp. 273. Price, $1.60. Fowler & Wells, publishers, 753 Broadway, New York. Chicago: Jansen, McClurg & Co.

"Mothers and Daughters." A Manual of Hygiene for Women and the Household. Illustrated. By Mrs. E. G. Cook, M. D. 12mo, extra cloth, $1.50. New York: Hygienic Publishing Co., 917 Broadway. For sale by the author, 917 Broadway, New York, and by C. S. and Geo. E. Halsey, 12 Madison st., Chicago.

"Public Health a Working Man's Question." An address to the Working Classes. By Alfred Carpenter, M. D,. Pam. pp. 20.

"Sewerage of Cities. A Reply to the paper of Col. Geo. E. Waring, C. E., of Newport, R. I, on 'The Liermer System of Sewerage for Baltimore.'" By C. W. Chancellor, M. D., Secretary State Board of Health of Maryland.

"Department of Public Instruction, City of Chicago. 29th Annual Report of the Board of Education for the year ending June 30, 1883." Chicago: Jameson and Morse. 1884.

Proceedings and Addresses at a Sanitary Convention held at Pontiac, Michigan Jan. 31 and Feb. 1. 1883. Lansing, Mich: Also, Proceedings of a Sanitary Convention at Muskegon, Michigan, Aug. 23 and 24, 1883. Supplied by the secretary of the state board of health.

"Report of Proceedings of the Illinois State Board of Health. Quarterly Meeting." Springfield, January 17-18, 1884.

NOTES AND NEWS.

ANNOUNCEMENTS.

February 14 and 15, at Columbus, Ohio, first meeting of the State Sanitary Association.

February 19, at Cincinnati, Ohio, annual meeting of the American Society of Civil Engineers.

February 20, at Chicago, annual entertainment of local Master Plumbers' Association.

March 26 and 27, at Beardstown, Ky. Meeting of the State Sanitary Council, under the auspices of the State Board of Health.

August 21–27, at the Hague, fifth session International Congress of Hygiene, Dr. Overbeck de Meyer, secretary.

PERSONALS.

Dr. Oscar C. DeWolf, health commissioner of Chicago, has been examining the sanitary administration of New York city.

Medical Inspector Adrian Hudson, assistant in the naval bureau of medicine and surgery, has been ordered to the European squadron.

Dr. Benj. Lee, of Philadelphia, has accepted the position of hygienic consultant to the sanitary protective and mercury seal company of that city.

WATER-SUPPLY.

Water-works have just been completed at Orange, N. J.

The water-supply of Greenwich, Conn., will be extended to Port Chester, N. Y.

Moline, Ill., has just completed its new water-works.

The water-supply of Malden, Mass., is very low.

Plans for water-works at Hudson and Weymouth, Mass., are being prepared by M. M. Tidd, C. E.

Surveys and plans for water-works at South Hero, and Hartland, Vt., are being prepared by Henry Harding, C. E., of Hartland Four Corners, Vt.

Hyde Park, Ill., has received bids for laying water-pipe in Sixty-third street and Oglesby avenue, the lowest being for a six-inch pipe, $1.15 per foot and $63.80 per ton, and for an eight-inch pipe, $1.40 per foot and $61 per ton.

SEWERAGE.

The mayor of Newport, R. I., recommends a board of health, an improved system of sewerage after plans by the city engineer, and a new city hall.

All sewer pipe manufacturers in the United States have formed a pool, with headquarters at Cleveland, O.

Detroit is at last stirred up about the condition of her sewers. It has taken four years for the seed Mr. Craig planted to blossom into public opinion.

More than ten million gallons of sewerage are discharged daily by the new sewerage system of Boston.

MISCELLANEOUS.

The civil engineers of Connecticut have formed a state association. B. H. Hull, of Bridgeport, is president, and A. W. Ricc, of New Britain, secretary.

A three-hundred-page volume will soon be ready for distribution, containing a complete report of the work of the state board of health of West Virginia, from the date of its organization to the close of 1883.

Steps are being taken to erect a $1,000,000 hotel at Milwaukee.

The builders' and traders' exchange of Chicago was incorporated Jan. 30, without capital, to promote mechanical and industrial interests; incorporators, George C. Prussing, George Tapper, D. V. Purington, H. C. Hoyt, and F. C. Schoenthaler.

Architect J. C. Cochrane, of Chicago, has been elected architect of the proposed court-house of Marshall county, Iowa, to cost $100,000.

(*Continued on page vii.*)

SANITARY APPLIANCES.

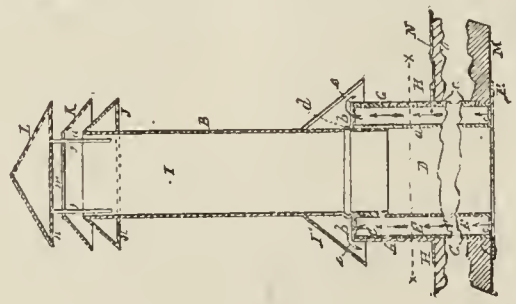
[*Under this head* The Sanitary News *will publish, in each issue, a complete record of all the latest patents of sanitary appliances issued at the United States patent office. Cuts will be reproduced of such as seem to have special merit. Single copies of printed specifications and drawings of any patent will be forwarded by* The Sanitary News *on receipt of twenty-five cents.*]

291,867. Electric Lamp. Thomas H. Blameirs, Huddersfield, County of York, England. Filed Sept. 12, 1882.

291,883. Faucet. Joseph H. Dorgan, Plattsburg, N. Y. Filed Feb. 7, 1883.

291,892. Steam and Hydraulic Pumping Engine. Harvey F. Gaskill, Lockport, N. Y. Filed Dec. 26, 1882.

291,919. Combined Ventilator and Chimney. William F. Matthews, Dallas, Tex. Filed June 25, 1883.

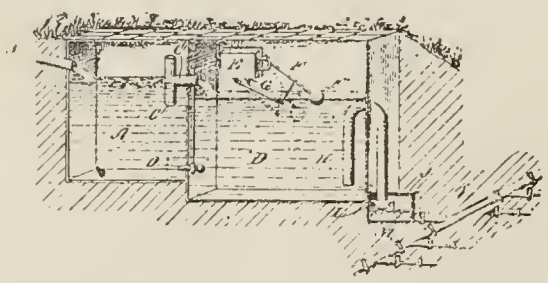


The section A consists of a central flue, surrounded by an annular air-chamber, in the top and bottom of which are openings, flange F, and case G, provided with a water-shed or apron. The section B consists of a flue or chimney I, its lower end inserted in the flue of the ventilator and extending above the roof. It is covered with a cap, and its juncture with the ventilator is protected by a downward-projecting hood I.

292,035. Tile, Pipe and Sewer-Protector. Robert B. Morrison, Vincennes, Ind. Filed March 19, 1883.

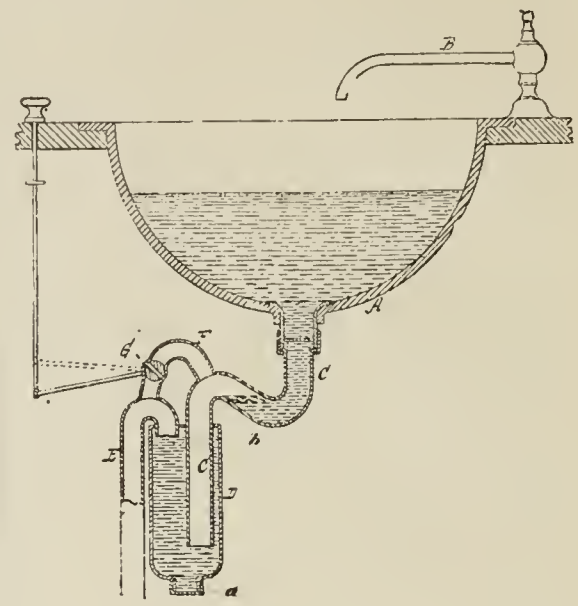
Within the cylinder is a series of strips fastened by one end to the shell of the cylinder, the other end inclining toward the axis, to prevent animals from passing through.

292,046. Disinfecting Tank for the Disposal of Sewage. James J. Powers, Brooklyn, N. Y. Filed Oct. 1, 1883.



The advantages claimed for this invention are: (1) chemical purification and filtration through the earth of the fluids: (2) accessibility to and convenience in the removal of the solids, the settling-basin not being over two and a half feet in depth. The sewage is allowed to flow into the settling-basin through the pipe B; the outlet C allows the fluids to pass over into the purifying-tank. When this tank becomes two-thirds filled, the fluid operates the valve F, and allows the disinfecting-fluid contained in the tank E to mix with the sewage, while the tank is filling to the discharge level, thereby precipitating the putrescible matters contained in it. The siphon H then comes into action and discharges the contents of the tank into the absorption tile through the valve M. The fluid contents are chemically treated before discharging into the earth, or adjacent streams. The intervals between the discharges allow time for the absorption and assimilation of the fluids, so that a super-saturation of the earth cannot occur.

292,055. Combined Trap and Overflow for Wash-Basins, Water-Closets, Sinks, etc. Carroll L. Riker, Brooklyn, assignor to Christopher Gulmann, New York. Filed July 18, 1883.



The closed vessel beneath the basin is so constructed as to provide an air-cushion in the top, which checks the flow of water out of the basin until it reaches a certain height. The opening of the stop-cock G permits the compressed air to flow out of the pipe F, and the water from the basin then flows through the outlet pipes and trap D.

292,113. Electric-Arc Lamp. Charles H. Hayes, Ansonia, Conn., assignor to Wallace & Sons, same place. Filed Nov. 10, 1883.

292,119. Method of Constructing Buildings of Artificial Stone. Theodore W. Tyrer, Stillwater, Minn., assignor to Sarah P. Tyrer, Los Angeles, Cal. Filed June 14, 1883.

The walls consist of blocks of artificial stone, provided with interior and exterior decorations, united by horizontal and vertical grooves filled with cement. On the interior the ornamentation forms base-boards, wainscoting, cornices, etc., and, on the exterior, cornices, brackets, friezes, capitals, etc.

292,159. Water-Closet Valve. John Demarest, New York city, assignor to the J. L. Mott iron works, same place. Filed March 2?, 1883.

292,160. Cistern for Water-Closets. John Demarest, etc. (see above) Filed April 28, 1883.

292,306. Joint for Air-Pipes. Benjamin R. Hawley, Chicago. Filed April 28, 1883.

The pipes have diagonal flanges at the end, over which is a clamping-ring, provided with a tightening-device, room being left between the base of the ring and the pipe to permit tightening of the ring and lengthening of the pipe.

292,318. Non-Conducting Covering. George Kelley, Chicago, assignor to the Kelley Scroll Section Mfg. Co., same place. Filed May 22, 1883.

The covering is composed of layers of paper, etc., folded upon themselves in the flat, and then bent to the required shape, in combination with longitudinal strips, to form dead-air spaces.

292,329. Manufacture of Portland Cement. Robert W. Lesley and James M. Willcox, Philadelphia, Pa. Filed Dec. 21, 1883.

292,414. Ventilating Buildings. F. A. Pilling, Colesville, Md. Filed July 20, 1883

297,472. Water-Closet Funnel of Railway Cars. Isaac H. Congdon, Omaha, Neb. Filed July 20, 1883.

292,535. Sewer-Pipe Machine. John R. Burdick and Wm. H Davis, Minneapolis, Minn. Filed Feb. 21, 1883.

292,559. Concretes and Concreted Pavement and Roof Pavement, and Sub-Structure for the Same. Thaddeus Hyatt, New York, N. Y. Filed Dec. 27, 1883.

292,631. Filter. Justin Durel, New Orleans, La. Filed July 25, 1883.

292,720. Incandescent Lamp. Edward Weston, Newark, N. J., assignor to the United States Electric Lighting Co., New York, N. Y. Filed Sept. 15, 1883.

292,766. Gas-Burner. J. Gardner Sanderson, Scranton, Pa. Filed Sept. 29, 1881.

Current Topics.

The present issue of The Sanitary News discusses, editorially, the latest and the most important questions bearing on sanitary science. A continuation of the articles on Chicago sewerage and sanitary administration in foreign countries will be found on succeeding pages. The concluding illustrations and descriptions of the system of a model eight-room school building are given. Considerable space is devoted to a description of the system of sewerage which has been devised for Saginaw City, by Benezette Williams, by reason of the practical importance of the subject, and the well-known reputation of the author. The importance of grate fires is discussed in "The House Interior," and the faulty ventilation of a Chicago school is exposed. A new device for raising water to the top floors of high buildings is illustrated and described, and full reports of meetings and doings of sanitary associations of all kinds throughout the country are published. There are descriptions and illustrations of late sanitary appliances, sanitary notes and news, and miscellaneous matter of an interesting nature.

The city of Freeport, Illinois, is one of the oldest cities in the State, and, to within a short time, has been a rather unprogressive place. The present city government, however, seems to be alive to the public needs of the town, and it has been supplied with a good public water-supply, a fine fire department, and it is altogether probable that the construction of a system of sewerage will be commenced the coming summer. Two prominent sanitary engineers have looked over the ground, but it is likely that the city engineer, F. E. Josel, who designed the water-supply for Galesburg, Illinois, will be asked to design the system of sewers for Freeport. There is also talk of adopting the electric light.

At the last meeting of the city council an order was introduced relative to the height of buildings. It provides that no building shall be constructed whose upper floor is more than one hundred feet above the grade of the sidewalk, the elevators and stairways to be so located as to provide for the greatest safety of the occupants. The matter was referred to the committee on fire and water, with the apparent idea that the watchful care of the city council over the people extends no further than to protect them against fire. If the height of buildings does not require their occupants to jump more than one hundred feet, in endeavoring to escape a roasting, the city has exhausted its ingenuity. The danger of living in, or occupying for offices, high buildings, has been absurdly overestimated. Protection against fire is best secured in proper construction of buildings, whether high or low, and in watchfulness after they have been built, rather than in means for drenching flames with water, which often does as much damage to goods and property as fire itself. The council might turn its attention, profitably, to this branch of the subject. The argument is sometimes advanced that it is a sanitary measure to limit the height of buildings, and *The Tribune* of this city recently printed an editorial argument to this effect. The principal objection to high buildings, from a sanitary standpoint, was that they shut out sunlight from the streets and lower floors, the latter thus becoming gloomy, damp and unhealthy. This might be the case, if there were no restrictions as to the space these buildings were to occupy on the ground. The width of the streets in a city already laid out and closely settled could not be altered, of course; but it would be a very easy matter to require that the spaces at the sides and in the rear of all new buildings shall be proportioned to their height, if higher than it is now customary to build them; the compensation for loss of ground would be found in the increased height. It seems self-evident that buildings, high or low, with broad open spaces between them on every side, free to be swept by the winds which, as in a city like Chicago, are always breathing pure air, and, more or less, warmed and dried by sunshine, must be more healthful and pleasant than low buildings, having the same amount of room and consequently built into compact blocks. Increased height cannot increase the dampness and foulness of basements, which are hemmed in on every side, except that of the street, and overcrowded. Space, laterally, in a city, is limited and valuable; upward, limitless and free. Intermediate space will secure sunshine and pure air; careful construction and watchfulness will prevent conflagrations.

The question of scavenger service in Chicago, as in every other city, is continually coming to the front as unsettled and disturbing. Tbe council is unable, or unwilling, to make an appropriation sufficient for the proper performance of the work, and the citizen is always in arms because the department of health does not accomplish that which, under the circumstances, is absolutely impossible to perform. It is folly to pretend that one hundred teams can collect and remove the accumulations of garbarge and ashes of a population of six hundred thousand people, scattered over an area of thirty-six square miles. The methods of work, however are faulty, and should be corrected as fast as circumstances will permit. The alleys should be cleaned as are the streets, by contract, and not individual teams employed by the department, and under the supervision of ward officers. A contractor will always secure a full day's work, while it is very doubtful if the sanitary officers do or can give such attention to the teams under their charge as to compel honest labor. The disposition of garbage, after gathering, is also an important question. The dumping of this savory material, either within the city or its limits, can not be permitted. It should be burned, and furnaces for this purpose are already in successful operation in some sections. Let the health department of this city get such a furnace at work as soon as possible.

The sanitation and reconstruction of central London was the subject of a paper read by Mr. William Westgarth, recently, before the society of arts. The principal portion of this paper is published by *The Builder*. Referring to the unsanitary condition and rapid growth of London, he thought that, with wider streets, the city might recompense the sacrifice of accommodations in one direction by seizing upon more of them in another; that is to say, by giving a greater right to new buildings. He thought there was plenty of room, both toward heaven above and in the earth beneath.

It is stated that not a day passes that attempts are not made to sneak diseased animals out of the Chicago stock-yards, or animals that have died in transit to the yards. It should also be stated that most, if not all, of this diseased meat finds its way to the stalls of Chicago butchers. A rigid inspection is maintained by the health authorities, but, in spite of this, the city people are fed with much beef and pork that is not fit to eat. A few vigorous prosecutions would have a wholesome influence in stopping this criminal traffic.

A main sewer in Detroit was recently found to contain a deposit in places, seven feet in depth, of decomposing organic matter. This accumulation extended back more than a mile from the mouth of the sewer. *The Medical Age* says, in reference to this matter: "While diphtheria has been endemic in this city for upwards of two years last past, it has been peculiarly prevalent in that part drained by the sewer in question. These are the facts. The other sewers have not, as yet, been systematically investigated, but when this is done it will not surprise us to learn that 'the visitations of God' in the form of diphtheria, will be found to be singularly closely associated with the delinquencies of man throughout." The not-pleasant allusion to the following facts is also made: "The water whence this city derives its drinking-supply receives between its source and our water-works the refuse matter and dejecta of nearly a million people. At this point it receives the excreta of upwards of one hundred and fifty thousand more, and then passes on and is drunk by the cities between us and the sea board." Experience, even to the point of bitterness, does not seem to be sufficient to teach people, when congregated in cities and communities, that it is unwise as well as disgusting to drink their own sewage, and breathe the gases of its decomposition. Any sanitary engineer can point out the remedies.

Judge Tuley, in the circuit court of this county, recently decided that a tenant could not interfere with his landlord in the latter's attempt to repair the water-pipes on the tenant's premises, when there were other tenants in the house, who would be affected by the lack of water-supply. An injunction was continued in force restraining the tenant from interfering with the landlord in making the necessary repairs.

Among the other sanitary wants of the city of Cincinnati is better sewerage and more of it. According to the annual report of Mr. H. J. Stanley, chief engineer, only two square miles of territory, out of the twenty-four comprising the city, are sewered. The engineer complains, with good reason, that there are thousands of vaults, or cesspools, in use, which overflow into the street gutters, and oftener into the rugged ravines, where the filth is retained until it becomes unbearably offensive and prejudicial to health. "Scores of these gulleys abound in Mount Auburn, Walnut Hills and Price's Hill, which are rank with accumulated filth from the elegant residences in the immediate vicinity. And yet there are people," continues the official, "apparently intelligent, who daily witness this state of things, and say that underground conduits for the removal of this stuff are not essential." It does seem unexplainable that people should regard these vitally important matters so lightly, and will take no remedial action until the seeds of epidemics are sown and often grown to a devastating maturity. Mr. Stanley urges the removal of the source of the city water-supply,—not that purer water may be obtained, but because, as things are now, nearly five miles of river front, and the hill territory adjoining, all of which is thickly settled, cannot, in any practicable manner, have sewerage, because not permitted to empty into the river above the pumping-works.

A member of the legislature of Ohio is endeavoring to crush out quackery by a bill "to regulate the errors of medical colleges, to prevent mistakes in diagnosing disease, to crush out egotistical ignorance, and to reward truth, justice and right, and to add healthful years to thousands of suffering citizens of Ohio, and for other purposes."

A bill has passed both houses of the Ohio state legislature authorizing the city of Dayton to choose its water-works trustees by popular election. A year or two ago the law was changed, vesting the power of electing the trustees in the city council. The manipulation of this matter had fallen into the hands of politicians, but it is believed that the question has now been satisfactorily settled.

Two state sanitary conventions have been arranged for the near future, in adjoining states, Indiana and Michigan. One will be held at Seymour, in the former state, on March 12 and 13, and the other at Hillsdale, Michigan, on April 17 and 18. It is significant that leading citizens, in both states, have consented, not only to the use of their names as supporting the movement, but to take active parts in the proceedings. At the Indiana convention, the welcome address will be delivered by Hon. Jason B. Brown, and the president of the Hillsdale gathering will be Hon. E. L. Koon. The subjects for discussion at both will be practical,—relating to food and water-supply, ventilation, sewerage and drainage, contagious and infectious diseases, etc. This will be the first convention of the Indiana state sanitary society, and is to be held under the auspices of the committee on state medicine of the state medical association. The latter fact is worthy of notice, since "medical men," are not, as a profession, disposed to look with favor upon the growth of sanitary science. The few high-minded physicians, whose ambition reaches above and beyond a mere traffic in the physical ills of mankind, are to be commended for the noble efforts they are making to prevent disease and preserve health. Every grown-up person living within a reasonable distance of these conventions should attend one or the other. The time will come when other communities will have the same privilege.

In attending to business interests which are of importance the Chicago master plumbers' association does not lose sight of the ways and means for the elevation and scientific instruction of the craft. In the new rooms, which will soon be occupied, provision will be made for the exhibition of sanitary appliances and of their working; and, besides, a library and reading-room will be opened. A considerable sum of money has already been set aside, from the funds of the association, for the purchase of books, and liberal donations in money and books have been offered. As will be noticed in another column, a leading plumber in New York

has sent a handsome contribution to the library fund. This generosity is to be commended and might well be duplicated by many others, as the money would be devoted to a good cause.

Rockford, Illinois, is playing with the fates. The fates in this case are allegorical representatives of a contaminated water-supply. The city is located on the Rock river, a fair-sized stream, which is obstructed in the city by a dam. The water-works and intake are situated a few blocks above the dam. About two hundred feet below the intake the main sewer of the city empties, also above the dam. Although there is an ordinance prohibiting it, there are six or more private sewers emptying into the river immediately above the water-works, and a slaughter-house still farther up. It is only a question of time when Rockford will be devastated by illness. Fortunately, now, however, the amount of sewage is small, the system not being very extended. It is hoped that no more sewers will be allowed to empty into the river above the dam, and that a continuance of the Mulberry street sewer will discharge its contents into the stream at some point below the dam.

The health-officer of Hillsdale, Mich., Dr. Bion Whelan, has made an annual report to the common council, which, though short, contains much of interest to his locality. There were but two deaths in 1883 reported from malarial causes, yet about six hundred ounces of anti-periodics were sold during the year. The health-officer has analyzed the water from a sufficient number of wells to warrant him in saying that nearly all the wells within the fire-limits are contaminated by organic matter. He urges the adoption of a series of small sewers, to be laid in the alleys, and emptying into the river. That is the only weak point in his report. It is still a question as to whether running water will sufficiently oxidize sewage to remove the danger. As the oxygen in the air should have free access to sewage in order to promote quick decomposition, it is not best always to have it immersed.

Mainly through the efforts of Dr. Felix Formento, the citizens of New Orleans have organized a cremation society of forty members New Orleans, more than any other city, needs a safe method of disposing of her dead, to take the place of the present system of entombment.

There is a false idea of economy in many of our smaller cities,—those which have from two thousand to five thousand inhabitants. In such places it is common to have the two offices of marshal, or police-watch, and health-officer, vested in one man who is, of course, a non-professional man. The health-officer, if he is really to act as a health guardian of the people, should, by all means, be a medical man. In the appointment of a marshal, the office is bestowed on a man usually as a reward for his services as a ward-striker. The result of having such an individual act as health officer, too, is to lower the position of health-officer to that of nuisance-abater. Some of the acts of such a health-officer are ludicrous in the extreme. In an interior river town in Illinois, the marshal-health-officer paid an old man a small fee for dragging dead animals from the river. The old man carefully attended to his duty, and with a wondrous thrift would take the dead animal up the stream again at night and place it in the stream again, from which he would remove it the succeeding day; he repeated this process so long as the animal would last. This disgusting recital shows how inefficient our health service in small cities may become.

A London exchange has the following in a description of the physiological work-shop of M. Pasteur: "From all parts of France hampers arrive containing fowls which have died of cholera or some other disease. Here is an enormous basket bound with straw; it contains the body of a pig which died of fever. A fragment of lung, forwarded in a tin box, is from a cow dying of pneumonia. Other goods are still more precious. Since M. Pasteur, two years ago, went to Pauillac to await the arrival of a boat which brought yellow-fever patients, he received now and then from far-off countries a bottle of vomito negro. Tubes filled with blood are lying about, and smaller plates containing drops of blood may be seen everywhere on the work-tables. In special stores bottle-like bladders are ranged resembling small liquor bottles. The prick of a pin into one of these bladders would bring death to any man. Inclosed in glass prisons, millions and millions of microbes live and multiply."

As already noticed on page 69 of this volume of The Sanitary News, an international health exhibition will be held at London, England, this summer. The object of the exhibition will be to illustrate, as vividly, and in as practical a manner as possible, food, dress, the dwelling, the school and the workshop, as affecting the conditions of the healthful life, and also to bring into public notice the most recent appliances for elementary school teaching and instruction in applied science, art and handicrafts. The exhibition will be divided into two main sections—health and education, which, in turn, will be further sub-divided into eight principal groups. The food resources of the world will be illustrated in the first group, as well as the best and most economical methods of utilizing them. The second group will relate to dress, chiefly in its relation to health. The third, fourth and fifth groups will comprise all that pertains to the healthful construction and fitting of the dwelling, the school and the workshop, not only as respects the needful arrangements for sanitation, but also the fittings and furniture, generally, in their effect on the health of the inmates. The sixth group will comprise all that relates to primary, technical and art education, and will include designs and models for school buildings, apparatus and appliances for teaching, diagrams, text-books, etc. Special attention will be directed to technical and art education, the results of industrial teaching, to the introduction of manual and handicraft work into schools, and to specimens illustrating the results of art and technical teaching. The exhibition will be held under the patronage of her majesty the Queen, and the presidency of his royal highness, the Prince of Wales, and will open May 1, continuing open for a period not less than six months.

Preparations are actively in progress for the permanent opening of the building exhibit and exchange in this city. Its value both to the public and exhibitor is apparent.

CHICAGO SEWERAGE — SPECIFICATIONS. — XXI.

MASONRY (Continued).

The bricks must be clean, and thoroughly wet, before being laid. The most perfectly formed bricks, and those with the smoothest surfaces, are used in the inside courses of the invert, the smoothest edge of the bricks being laid to the face.

The face joints do not exceed one-quarter of an inch; and the collar joints not less than half an inch in thickness.

The mortar joints on the inside of the sewers, below the center line, are carefully struck when laid, and those above scraped smooth with the bricks immediately after the centers are struck. The refuse mortar is scraped off and removed entirely from the sewer before it has time to harden.

OUTLETS.

The outlets for main sewers are built in accordance with plans and specifications supplied for each case. The terminations, or intersections, of sub-mains and laterals with main and sub-mains, respectively, are made through brick, or pipe, junctions previously built. If for any cause the junction previously made in the sewer, with which the contractor is to connect, is to be changed in size or position, or a new one is to be built, the contractor, without extra price, does all the necessary excavation, or labor of any kind growing out of the change—except that of the skilled mason who does the mechanical labor, which is done by men furnished by the city, unless directions are given otherwise, in which case the contractor does all the work and receives therefor compensation for the actual time of the mason at current rates per day.

SIDE-JUNCTIONS.

Intersections or entrances for lateral sewers, whether of brick or pipe, and all junctions for street drains, are built into the sewers at such places as shown on plans, junctions for house drains to commence ten feet from street corners and placed thence twenty feet apart through the blocks in a thorough and workmanlike manner. Wherever required, the brick intersections are strenthened by backing up the angles with walls or piers of masonry. The junctions are bricked off at their ends, thoroughly closing them against sand or other material. The pipe junctions are closed by laying the brick against the end of the pipe. In no case are the bricks placed inside the pipe.

BACK-FILLING.

After the arching is completed on any length of sewer, and before the centers are struck, the trench is filled to a height of at least two feet above the arch. On brick sewers, the spandrels are well consolidated to a height of six inches above the crown of the arch, by thorough ramming, wherever the ground is of a nature to admit of it. As soon as possible thereafter the trench is filled to the surface of the ground. The sheeting is, in no case, drawn before the trench is sufficiently filled to prevent liability of injury to the banks, road surfaces, adjacent pipes, railroad tracks, sidewalks, or other property, public or private.

In all streets or parts of streets that are paved, graveled, macadamized, cindered, planked, or covered with any material other than the natural ground, all the back-filling is well rammed with suitable tools in layers not exceeding six inches in depth, provided the ground is clay, stiff loam, or any variety of a tenacious nature. If the ground is sand or gravel, the back-filling is puddled in such manner as directed.

After being puddled or rammed to the required height, as specified, the paving, of whatever variety, is replaced carefully and thoroughly in a manner adapted to its peculiar character in each case, and to the satisfaction of the commissioner of public works.

The surplus material taken from the trench is removed entirely from the street, or disposed of in such other manner as directed, so as to save the city from all damage or expense.

In unpaved streets, after filling over the arch, as specified, the back-filling may be put on without ramming or puddling, the surplus earth being crowned up over the sewer, spread over the surface of the street, or thrown into the side ditches, as directed. The back-filling, in all cases, is left with a smooth and even surface. Where required, the back-filling is not left unfinished more than one hundred feet behind the complete masonry or pipe work.

PIPE-LAYING.

Each pipe is laid on a firm bed, and in perfect conformity with the lines and levels given. The ends of the pipes abut close against each other, in such a manner that there is no shoulder or want of uniformity of surface on the bottom of the interior of the drain. The rings are placed centrally around the joints of the pipes. The joints between the rings and the pipes are as uniform as possible in thickness, and thoroughly filled with mortar. Each joint is wiped clean of mortar on the inside, before another length of pipe is laid.

SPECIAL AND GENERAL REQUIREMENTS.

The sewers, after completion, are left entirely clear of rubbish of every kind and description. The dead ends are carefully closed with brick and mortar so as to exclude all running sand and other material.

The commissioner of public works reserves the right to connect house, and lot, or street drains with any of the sewers embraced with the specifications, as soon as he deems it expedient.

The commissioner of public works is permitted to remove such portions of the work as he may from time to time think necessary for the discovery of improper materials or workmanship; and the contractor must restore such work at his own expense, in case it shall have been done improperly, and at the expense of the city of Chicago, if done in a proper manner.

The contractor is required to guard the public effectually from liability to accident, in consequence of his operations, during the whole progress of the work, both by night and by day, and is held responsible for any damages the city may have to pay in consequence of neglect on the part of the contractor to protect the public against such accident.

The contractor is also held responsible for all damages the city may have to pay to private individuals or corporations, in consequence of any of the acts, or doings or neglect of the contractor or any of his employés, in connection with the work. In addition to the necessary barriers, a red light must be maintained, at night, at each end of the trench.

Water used from the city water pipes by the contractor in the construction of work, is paid for by him, at the usual rates, the rates being based upon the amount of brick or mortar used in the construction of the work. The contractors are not allowed to draw any water from the public fire hydrants, except by special permit and license issued by the proper city official.

The contractor is required to dismiss from his employment all incompetent or unfaithful persons; also to keep in perfect repair, for six months after its completion, the whole of his work, except in cases where the repairs may be rendered necessary by causes clearly beyond his control.

Whatever precaution unforseen circumstances may render necessary in the judgment of the commissioner of public works, in order to make the sewers both unyielding and impervious, must be taken; and all extra work, or materials rendered necessary thereby, which may be ordered by the commissioner, must be paid for at his estimate.

SANITARY ADMINISTRATION IN FOREIGN COUNTRIES.—SWEDEN—III.

BY DR. FREDERICK EKLUND, STOCKHOLM.

ON THE CARE OF HEALTH AND ON SANITARY INSPECTION IN THE COUNTRY.

The principal care of the public health in the country belongs to the communal committee. The creation of this committee is brought about in such a manner that, at the general communal meeting, the parishioners choose, with respect to the number of inhabitants of the commune, the number of members, which will constitute the communal committee; this number may not fall under three, nor exceed eleven. At the same time is chosen a number less by half than the elected members, to supply in lawful absences, the places of the ordinary members, or, when the number of members is not full. The general communal meeting chooses, among the members of the committee, a president and a president-deputy, liable to hold their offices during the time that they are elected to be members of the communal committee, to the position of speaker and of speaker-deputy of the communal committee, the president and the president-deputy of the general communal meeting may be elected, provided they are members of the committee.

When the communal committee manages business concerning the care of the public health and of the sick, the provincial and district physicians concerned, even if they are not members of the committee, have a right to be present and take part in the deliberations, but not in the decrees. The meeting of the communal committee for management of business concerning the care of the public health and of the sick ought to take a place speedily if asked by the provincial or district physician.

It belongs to the states of the provinces, by law contained in the statutes of March 21, 1862, to consult and decree concerning sanitary matters which are common for each territory governed by a commander, and with respect to the care of the health of the inhabitants of the districts, as far as this business is in conformity with valid regulations, and is not subject to the official intervention of a public authority.

Special prescriptions are issued concerning epidemic and contagious diseases. As to the general regulations, that are enacted especially for this purpose, the commanders of his royal majesty shall, each within his government, see, as already mentioned, that the communes and their special administrations, and also the physicians concerned, perform their duties with respect to the care of the public health, for which purpose the commanders of his royal majesty have a right to enjoin, under proper fines, where such are necessary. When it comes to the notice of the commander of his royal majesty by a report from a physician, or committee, or otherwise, that more general sickness or great mortality is of any longer duration, or recurs repeated times in consequence of bad local conditions in any town, or that in a city or in the country miserable sanitary circumstances are prevalent, it is incumbent upon the commanders of his royal majesty to take care that suitable measures are taken to redress the evil.

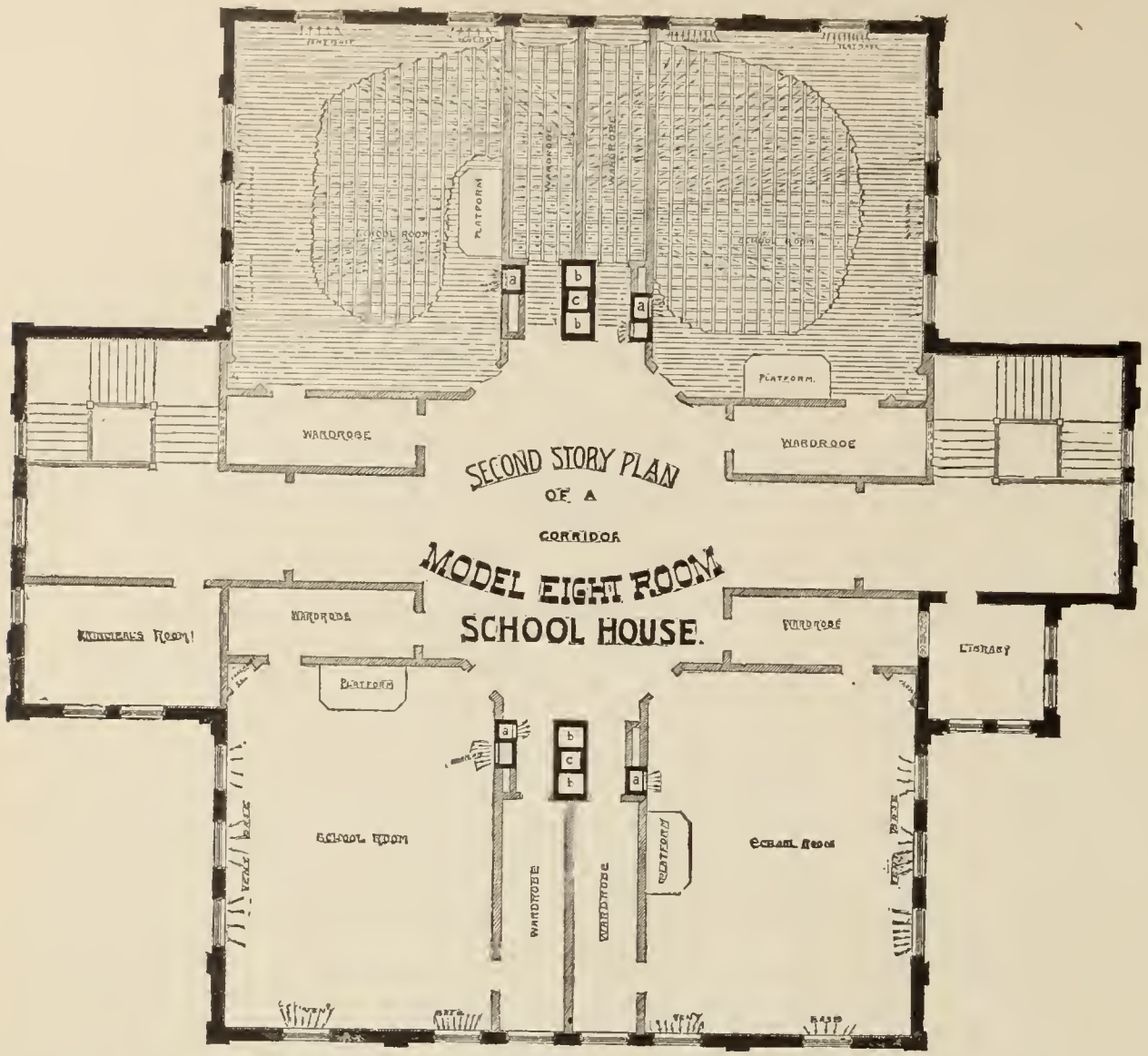
OUTLINES OF INSTRUCTION FOR PROVINCIAL, DISTRICT, AND CITY PHYSICIANS AND OTHERS WHO PRACTICE THE ART OF MEDICINE.

1. *Provincial physicians.*—§ 1. On duties of service. The duty of service for provincial physicians is to exercise the inspection over the sanitary conditions and the care of the sick within the district in the manner that this instruction determines, to prevent diseases arising and their spreading, and even to perform, in the same place, occurrent medico-legal business. This duty may, as occasions demands, be extended for each physician, even to the districts that are bordering upon his own. Besides, the provincial physician is required to provide for the private care of the sick, who solicit his help, in the proportion that his other duties of service may allow, and in the manner that is more definitely fixed in § 36, for which assistance he has a right to receive a just, moderate and reasonable compensation. He is also required to give certificates for individuals. § 2. Next proposed authority. § 3. Nomination. § 4. Entering upon the service. § 5. The area of district for the duty of service. § 6. Vacancy from services. § 7. The participation of directions and committees. § 8. The keeping, sending in and demanding of records. § 9. General preventive means against diseases. § 10. Attention to epidemical diseases. § 11. Intervention in cases of veneral diseases. § 12. The prescribing of free medicines. § 13. Vaccination. § 14. Midwives. § 15. Apothecaries shops. § 16. Survey of the arming or equipment. § 17. Opinions, attestations, surveys. § 18. Examination of dead bodies. § 19. Certificates for privates. § 20. Care of marching military. § 21. Annual reports. § 22. The credit of the account of the provincial physicians.

2. *District physicians.*—§ 23. Reception. § 24. Vacancy, leisure, or unconstrained freedom. § 25. Duties.

3. *City physicians.*—§ 26. The reckoning of years of service. § 27. Nomination. § 28. Liberty from service and dismission. § 29. Duties. § 30. Special instructions. § 31. Annual reports.

4. *General rules.* § 32. Relation to the medical direction. § 33. Competency to exercise the art and science of medicines. § 34. Competency for advancement and reckoning of years of service. § 35. Competency to perform medico-legal examinations. § 36. Common duties. § 37. Taciturnity of medical men.



Heating and Ventilation designed by Ruttan Mnfg. Co., Chicago.

FIG. 3—SECOND STORY.

Presented by Edbrooke & Burnham, Architects, Chicago.

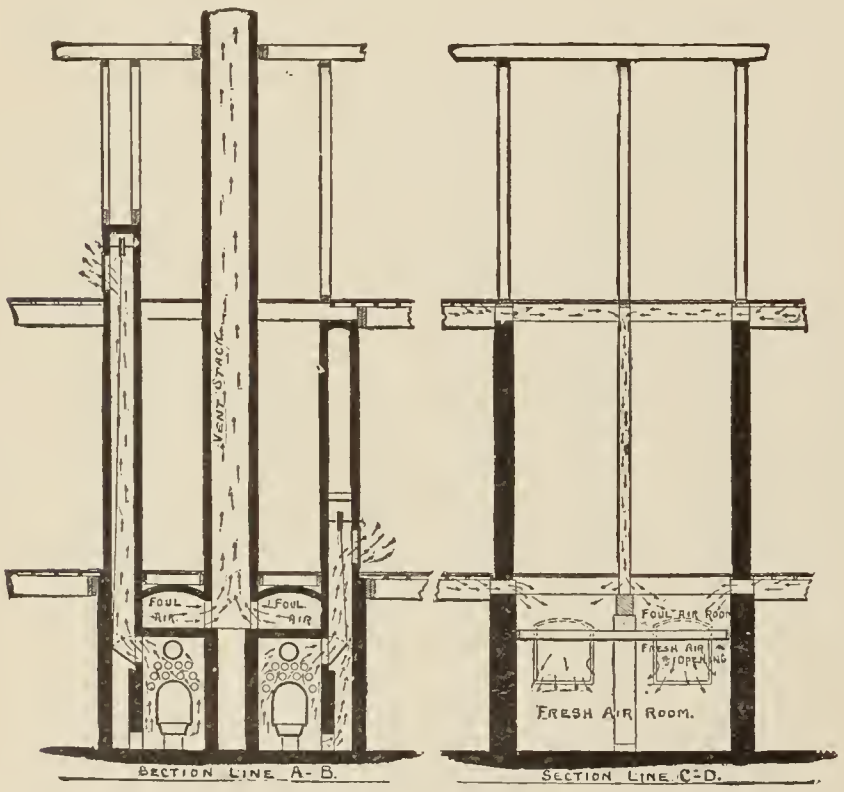


FIG. 4—SECTIONAL VIEW.

MODEL EIGHT-ROOM SCHOOL BUILDING—II.

The second-story plan of a model eight-room school building is shown in Fig. 3 (Figs. 1 and 2 were given in the last issue of this journal). The same lettering indicates the hot-air flues and foul-air shafts, while a greater portion of the floor is taken away, showing the movement of the air on its course from the vents under the windows to the foul-air shafts.

Fig. 4 gives two sectional views on the lines A B and C D in Fig. 1. The openings for fresh air, and the fresh-air room, are shown at the right. The air passes over and between the pipes of the furnace, as shown at the left, and thence upward through the flues to the rooms. The supply is regulated by a damper, completely under the control of a person in the room. It is also seen that, while the supply of hot air may be shut off, cold air is at the same time admitted, so that checking the heat does not imply a lack of fresh air. The foul air is conducted to a foul-air room directly over the furnaces, and thence passes up and out the vent-stack, as shown.

The arrangement of the rooms, as to convenience, accessibility, light, etc., should not be lost sight of.

EXPERIMENTS WITH A VENTILATING FLUE HAVING TWO OPENINGS IN THE SAME ROOM.

In The Sanitary News for February 1, 1884, in a communication from Dr. La Grange Severance on "country school-houses," the writer stated that if, in a flue having an opening for the exit of foul air at the floor level, an opening into the same flue at the ceiling should also be made, the admission of a current of hot air through the register at the ceiling would increase the current in the flue, and thereby more vitiated air would be drawn from the room through the lower register. The following experiments, just performed by Prof. Frank S. Kedzie, of the Agricultural college of Michigan, at Lansing, shows this statement to be incorrect. A room thirty feet square is ventilated by a flue forty-five feet high. There is an opening into the flue just above the base-board, the bottom of the flue being fifteen feet below it in the basement, but having no lower opening. Hence, there is a draught of thirty feet in the flue. The upper opening into the flue is eleven feet above the lower opening and directly above it, by a plumb-line. The openings are one foot square and the ventilating flue sixteen inches square, not heated artificially. The temperature during these experiments at the upper opening was 71°, and at the lower opening 55°. The air-meter was placed directly in front of the lower opening. The following tabular statement shows the result of the experiments:

EXPERIMENTS WITH VENTILATING FLUE HAVING TWO OPENINGS IN ONE ROOM—TEMPERATURE AT UPPER OPENING, 71°; AT LOWER OPENING, 55°.

Experiment number.	Opening at floor.	Opening at ceiling.	Length of experiment.	Feet of air passed lower opening.
One.....	Open.	Closed.	2 min.	308
Two	Open.	Open.	2 min.	238
Three..... ..	Open.	Closed.	1 min.	153
Four	Open.	Open.	1 min.	118

As the vitiated air at the floor level can only be removed through the lower opening, under ordinary circumstances. these experiments by Prof. Kedzie show that Dr. Severance's statement that the introduction of warm air at the ceiling will increase the flow of vitiated air through the lower register, is wrong.

SAGINAW CITY SEWERAGE.

A system of sewerage has been planned for Saginaw City, Mich., by Mr. Benezette Williams, C. E., of this city, adopted, and will be immediately constructed under Mr. Williams' supervision. The old sewers will not be seriously interfered with except in one instance. For topographical and other reasons the portion of the city to be dealt with is subdivided into seven sewerage districts, each containing from 310 to 720 acres. The outfalls for the ordinary flow of sewage are into the Saginaw river, below the water-works; but additional provision is made for

the discharge of storm-water into the bayous, or into the river. In locating the mains the endeavor was to obtain the best possible slopes for the sewers with the least expense for excavation, and to secure the most direct route to the outfalls. It was also the aim to place them on streets where sewers were needed at right angles to the river, so that the least preliminary expense need be incurred in effecting the sewerage of the more populous portions of the city. In general, the system will require sewers on the streets running in but one direction. In the central part of the city, if the streets lying parallel with the river, and a few of the principal thoroughfares upon which the mains are located, are sewered, all the improvements will be accommodated except in special cases. When such cases occur, a six-inch pipe sewer, one or two hundred feet in length, will usually fulfill the requirements. The ability to reach all the property without building sewers on every street in each district renders the cost of the system much less than it would otherwise be.

The sewers have been designed to carry off all the storm-water, except along the river where the ground lies lower than the sewers, or where the slopes are favorable for turning it directly into the river. They have not been proportioned, however, to take this water off as rapidly as it is customary to do in compactly built cities. The rapidity with which water will reach the sewers depends upon the ratio of the combined area of roofed and paved surfaces to the whole superficial area, and also upon the slopes of the paved surfaces, and the frequency with which inlets from these surfaces are provided. In Saginaw, the area of roofed and paved surfaces, compared with the whole, will probably always be small, and it is proposed to make as few street inlets as possible, and so to limit their capacity as to restrict the rate at which surface water will be admitted to the sewers By this means a considerable saving in the cost of the system can be effected without serious inconvenience. The sewers, as designed, will carry without gorging from one-quarter to one-third of an inch rainfall per hour. By observing the restrictions as to the number of street basins and the size of the pipe—six inches—connecting them with the sewers, Mr. Williams thinks that no difficulty from overcharge will probably be experienced once in a generation.

Mr. Williams further says that there is scarcely a city in the country where the sewers are of sufficient capacity to carry the maximum rainfalls, it being deemed better to suffer some temporary inconvenience, at long intervals, than to impose the burden of so costly a system of sewerage as would be necessary for the excessive rainfalls that perhaps occur once in many years. There are times when the high water in the Saginaw river will entirely submerge the mouths of most of the main sewers, and will set back therein for a short distance. All of the city lying below the fifteen-feet contour is liable to have basements and cellars flooded by high water in the river.

The minimum depth of lateral sewers at their extremities, and at the summits, is from six to seven feet, measured from the grade of the invert. The average depth, however, is very much greater. The least inclination given to any main sewer is 8-100 of a foot to 100 feet. The inclination for pipe sewers varies from 3-10 of a foot per 100 feet to 1 foot per 100 feet, according to circumstances. It will average about 5-10 of a foot per 100 feet. Generally, the minimum inclinations are such that whenever the sewers are carrying 10 per cent of their ultimate capacity, the velocity will not be less than 1¾ feet per second, and when carrying 50 per cent of their capacity it will not be less than 2½ feet per second. This will insure a thorough flushing throughout their entire length by every considerable rain.

All sewers exceeding the capacity of a twenty-inch circular pipe will be of brick, and they are to have an egg-shaped section with a horizontal diameter equal to two-thirds of the vertical diameter, except when the sewer is used exclusively for a storm-water outlet, or when the height of the ground is such as to make it desirable to secure capacity at the expense of the vertical diameter. All sewers twenty inches in diameter, and less, are to be of vitrified clay pipe.

Manholes are provided at the intersection of one sewer with another, at all changes of grade and direction, and at the ends of the sewers. This makes the distance between them, generally, the same as the length of an ordinary block. Their average distance apart is 350 feet. Mr. Williams says: "Experience has shown that for large sewers, that can be entered, this is close enough under all conditions, and that when the grades are good, and proper provisions have been made for frequent flushing, it is close enough for sewers that cannot be entered. Intersections occur in all cases at a manhole. Special detail plans are furnished for all the intersections of one brick sewer with another, and a plan showing the general method of connecting pipe sewers with brick sewers, and another showing the connection of one pipe sewer with another pipe sewer. The intersections of sewers of different sizes should never be with the inverts on the same level. The tops of the sewers, except when the disparity of sizes is very great, should about correspond. When the disparity is great, a good rule is to place the top of the lateral sewer about even with the axis of the main. Cases arise, however, where, in order to get a proper grade for the lateral sewer, it is necessary to place the inverts of the two sewers within six inches of each other. The intersection should never be at right angles, but by a curve in the lateral sewer, joining the main sewer at an angle of about 35 degrees. When both are pipe sewers, the curve should be entirely made in the manhole. Where one is a brick sewer, the curve should be made exterior to the manhole.

"House drain intersections should be made with an angle of 35 degrees, the junctions being placed at the time the sewers are built, and at a distance of thirty feet apart on each side of the sewer. House drains should have a fall of at least one in one hundred. They should not, except for special reasons, be larger than six inches in diameter, nor smaller than four inches in diameter. For the most of dwellings, and many other buildings, a diameter of four inches is sufficient. The city should control the connecting and laying of house drains, and should prescribe the manner of putting all soil and waste-pipes into buildings. Regulations governing such work should be adopted and strictly enforced by the municipality. While there may be an endless variety of detail, the main principles to be observed are few and simple. A trap should be placed on the house drain before it enters the house, and a fresh-air inlet provided between the trap and the house. From the fresh-air inlet, into and through the house, the main soil-pipes should be of iron, with absolutely tight joints. The smaller waste-pipes may be iron or lead or both. Every pipe upon which a water-closet is placed should be extended, full size, through the roof to the height of a few feet above. No traps should be placed on any soil or waste-pipes after entering the house, except close to each fixture. With all small fixtures, such as wash bowls, bath tubs and sinks, the traps should be ventilated with an independent pipe, either running out at the roof, or connecting with the main soil-pipe above the highest fixture. The greasy water from kitchen sinks should not be admitted to the house drains directly, but should pass through a grease-trap, where the grease may be intercepted, in order to prevent the pipes filling up by the grease adhering to their sides.

"No system of sewers should be built without provisions for a free circulation of air through them. The practice of leaving no vents in sewers, thus forcing the gases of decomposition to find outlets through house connections, or whatever channel may afford the least resistance to their escape, cannot be too strongly condemned. The cheapest and most available method for ventilation of street sewers is by means of open-topped manhole covers, and trapless street basins. Another method sometimes resorted to—and a good one so far as ventilation is concerned—is to have all house drains laid without being trapped at any point between the sewer and the houses, and the soil-pipes connected with the drains in the same manner, extended through the houses to a height of a few feet above the roofs, thus forming channels for the circulation and escape of gases above the house tops.

"Could all the drainage and plumbing in the houses be done under one management, of good material, and by skilled and honest workmen, I would not hesitate to recommend this method of ventilation; because, for efficiency, cheapness and simplicity, it leaves little to be desired, and, in my judgment, no valid objection can be urged against it under such circumstances. Indeed, in the only instance in my practice where it was possible to conduct the work in the manner described, I have adopted this method with good results. I do not, however, consider that its use should be recommended under ordinary auspices.

"By placing a trap on each house drain, just outside of the house, and connecting a ventilating-pipe with the drain, close to the trap, but between the trap and the street, and extending it on the outer walls of the house to the height of a few feet above the highest part of the roof, the same result will be obtained in the ventilation of the main sewers, without the risk attending ventilation through the soil-pipe in the house. This will add a few dollars expense, and, perhaps, it will be unfair to require each householder to bear such an expense merely for the purpose of carrying out a general sanitary measure. I am satisfied, however,

that the measure should be carried out, if not at the expense of the individual householder, then at the general expense. This measure, however, will not be sufficient to make it safe to dispense with surface ventilation in the streets. Trapless street basins and ventilating manhole covers should be used nevertheless.

"There are some practical difficulties in using street openings for ventilation. A part of them will become stopped with ice and snow. If no means are taken to prevent it, dirt will drop through the openings in the manhole covers and cause more or less deposit in the sewers. This difficulty is overcome by making a trough in the base of the cover under the openings, from which the dirt is cleaned from time to time.

"Provisions have been made for flushing the upper end of each branch sewer, by means of an automatic flushing reservoir. The reservoir is to be of such size as to furnish water enough thoroughly to wash the sewer for several hundred feet. A small stream of water is kept constantly running into the reservoir, and when it is filled to a given height its whole contents are discharged, by means of an automatic siphon, as rapidly as the sewer will carry it off. After the reservoir has been entirely emptied, it again fills slowly to be again emptied in like manner. If the reservoir is emptied once in a day or two it will answer the requirement of keeping the upper portions of the sewers clean, where foulness is most likely to collect."

The total estimated cost of sewering the 1,432 acres in six of the seven districts is $365,564.10. The total length of the new sewers will be 34½ miles, the average cost per mile thus being $19,596, and per acre $255.30.

In his report to the city council Mr. Williams calls attention to the necessity of a vigilant supervision of the construction of sewerage, and urges that the only safe way is to have it inspected by a competent and faithful person. The engineering should also be carefully attended to. A true grade should be maintained, as irregular grades render it impossible to keep sewers clean. Deposits are sure to be made in the ponds formed by irregularities in the grades, and deposits invariably mean foulness. Constant watchfulness is also necessary, particularly in the matter of catch-basins. If these are allowed to fill with street washings all the heavy material will be carried into the sewer during a rain, and the sewers will be no better off than if the basins did not exist.

Mr. Williams closes his report by a discussion of the merits of the combined and separate systems of sewerage. He says: "In a city like Saginaw, with a comparatively impervious subsoil, and with large districts whose topography furnishes almost no facilities for the natural removal of storm-water in an expeditious manner, one of the first and greatest inconveniences felt is that arising from lack of surface drainage. Hence the introduction of make-shifts, as box-drains and open ditches. The inconvenience suffered from this cause increases, rather than decreases, with the growth of population and the multiplication of buildings. It is only after the introduction of a general water-supply, and after population becomes comparatively dense, that the need of the removal of household waste is seriously felt. From the standpoint of convenience alone, the removal of storm-water from a considerable part of the city would seem to be more urgent than the removal of household waste, while from a sanitary standpoint both may be said to be equally desirable. The main arguments in support of a separate system are of two classes: 1, those of universal application, and, 2, those having only a local application. Those coming under the first class are that, the sewers being smaller, the minimum flow of sewage more nearly conforms to the capacity of the sewer, and hence a better scouring effect is obtained with a given inclination; also, that the surface of the sewers exposed to the accumulation of filth is less; that there is no street detritus to form deposits in the sewers, and that the cost of the system is less, both to build and to maintain. The arguments belonging to the second class are that, if the sewage has to be treated by some chemical process, or applied to land for purification, or used for agricultural purposes, or if it has to be pumped, or carried long distances for disposal, there is a great advantage in having a small and nearly uniform amount to deal with.

"Arguments of the second class, while of great moment in some cases, are, obviously, without application to Saginaw. Those of the first class, relating to the greater cleanliness of the sewers, are of considerable force, though their force is often greatly exaggerated, owing to the comparison of a badly-built and illy-maintained combined system with a well-built and carefully maintained separate system. The argument from the cost standpoint is always apparently strong, though generally when used with reference to large cities, and often when used with reference to small ones, it will be seen to be fallacious if only the comparison of cost is carried far enough to include consequential expenses.

"In all large cities, and in many of smaller size, it becomes necessary to carry off storm-water through underground drains, or to incur great inconvenience and expense in getting rid of it on the surface. If underground drains are used they must be well built, as large and generally nearly as extensive as a complete combined system. There will then be two systems, which will invariably cost more than one to build and to maintain. If underground drains are not used, then storm-water must be taken off on the surface, and in the most of such cases, either great inconvenience must be suffered, and perhaps damages sustained at times by the community, or great expense incurred in building and maintaining a system of gutters and culverts. The additional cost of such a system of gutters and culverts will, in my judgment, generally fully equal the difference in cost between a separate and a combined system of sewerage, and may, in many instances, greatly exceed it.

"So far as the greater portion of the city of Saginaw is concerned, I am satisfied that no system of open gutters can be made to remove all the storm-water with any degree of satisfaction. Hence, if a system of sewerage should be adopted, providing only for household waste, there would be no alternative but the construction of a second system of underground conduits to convey the storm-water to the river. So that the separate system of sewerage means a double system, and a double system means greater complication and greatly increased expense, not only to the city as a whole, but to individual householders as well. For in the event of two systems, in order to take roof-water away from the buildings, either two house drains will have to be laid—one for each system—or open gutters used, or the roof-water must be allowed to spread over the surface of the yards and find its way to the drains as best it can.

"The conclusions to which I have come regarding the system to be adopted in sewering the city of Saginaw may be briefly restated as follows: (1) That both the storm-water and the household waste must be conveyed to the river through artificial channels. (2) That owing to the long distances, with the slight inclinations traversed by the most of your streets, it is impracticable, both on the ground of expense and convenience, to attempt to remove storm-water by open gutters and culverts, and hence, (3) That storm-water must be taken in underground conduits. (4) If storm-water is to be taken in underground conduits, it can only be done by means of a combined system of sewerage, or of a double system, one for storm-water and another for household waste. (5) That a double system will not only cost materially more than a combined system, but it will cost nearly twice as much to maintain, besides introducing complications which it is certainly best to avoid. (6) That, while it is admitted that for reasons previously given, a double system will have a sanitary superiority over a combined one, the extent of this superiority has been by no means certainly ascertained, and that, however great it may be, it has not a sufficiently defined place among the realities to render it incumbent upon a city to disregard the firmly established advantages of a combined system.

"After all, in the absence of any exact method of determining the relative merits of the two systems, it must remain a matter of judgment, based upon only partially verified truths, as to which should be adopted for a given place. In exercising judgment one can be guided solely by the abstract, theoretical reasons, for and against the two systems, as colored by his individuality; or he can take into consideration the judgment formed by others, who, from a wider experience, or other causes, have perhaps had better opportunities of arriving at a correct conclusion than himself. If the former course is pursued, we need not be surprised at opposite opinions. If the latter, there would seem to be but one conclusion that can be formed, and it would be in favor of the combined system.

"The accumulated experience of both European and American cities, and the concurrent judgment of the great majority of engineers engaged in sewerage and other branches of municipal engineering, is unmistakably in favor of a combined system under such conditions as, in my judgment, obtain in Saginaw. In the face of the opposition which, for one reason or another has been brought to bear upon this system, I believe the facts will bear me out in the assertion, that there has been no odium cast thereon that should outlaw it from a civilized community. The alleged sins that have been visited upon it, when sifted of legend, and irrelevant facts, have been found to have their origin in bad plans,

wrong proportions, irregular and insufficient grades, and careless building and maintenance, and not to be original and inherent in the system itself."

As the spring approaches, and the heat of the furnace or the large stoves becomes oppressive in the house, an emphatic word should be spoken in favor of the open fire. More colds are taken, and more serious diseases resulting from them are contracted, during the spring and fall, after the furnace fires have been discontinued, and before the warm weather comes, than at any other season. A large wood fire in a large fire-place is, of course, the most desirable ; but to most people in a city it is altogether unattainable. An open grate, in which anthracite, cannel coal or coke can be burned is nearly as good, and can be placed in any house. When not in constant use, the fire should always be laid ready for lighting at a moment's notice, and through all the chill and rain of our fitful spring-time, and the muggy dampness of summer, the house should have, at least, one grate fire. This should be in the living-room, where its use as a ventilator and purifier of the air gives it great additional value. If possible, the sleeping-rooms also should be supplied with grates. Many people cling to the idea that the air of a sleeping-room should never be heated, but pure air is not necessarily cold or damp air, and where the ventilation is ample, an open fire will often be found of great benefit, especially in the bedroom of an invalid, or a delicate person. In the nursery, the open fire is indispensable. Children cannot thrive without a constant circulation of fresh air, either while at play or asleep, and the danger of their setting themselves on fire may be obviated by placing a wire-screen over the grate opening, and by a little extra watchfulness. How many fretful, heavy-eyed little ones, who lean languidly on the lap of an over-tired mother, are suffering solely for want of pure, fresh air, the finest gift of Heaven, and the one least appreciated, and least intelligently used. When the time for spring-cleaning comes, many tidy housewives will have the grates taken out, the iron fronts newly varnished and put in place, and will shiver complacently through the cold, wet days of spring and summer, sustained by the thought that their rooms are clean and in order, and that they are in no danger from that dust-trap, the grate, little realizing that its absence means exposure to dangers far greater than the presence of a little ashes and dust. Leave the grate in place, and dispense altogether with the open-work, iron grate-front, which has nothing to recommend it either in the way of use or beauty. If the grate is so unsightly a thing, and if a finical nicety demands its concealment, place a movable screen, or a picture, before it, when it is not in use ; but, if the health and comfort of the family are matters of any moment, do not hide it so that it cannot be used any hour of the day, or any day of the year, when it is needed. Dr. Dio Lewis has several open fireplaces in his own house, and says that for any other purpose he should think the expense greater than he could afford ; but, recognizing their sanitary necessity, he prefers economizing in any other department of the household. Elizabeth Cole, in a recent number of *The Current*, pays the following charming tribute to the open fire : "Its busy tongues discoursed eloquently of warmth and sang of cheery comfort, and so I turned from that dim world without to that other world behind the andirons, that life-picture framed in tiles, resting on that rock of ages, the hearth-stone."

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* *

THE new upholstery and curtain goods show little change in colorings. Shades of olive, yellow, and dull reds and blues are as popular as they were last year. The designs are usually large, and take natural and conventionalized floral forms. Modifications of the French renaissance designs are much used. There is no color more satisfactory for the ground work of a room than olive, especially in the warm or yellowish tones, and it can be combined with any other color. The darker shades, which are composed largely of green, are less satisfactory, as they are often cold and lifeless in effect. The different shades of brown and yellow, running through the tones, from a rich golden brown to a pale gold, can be very effectively used in the decoration and furnishing of a room. The browns have variety enough in shade to prevent monotony, and the yellows should be sparingly used, for the high lights. A symphonic arrangement of this kind requires much more thought and artistic skill than is usually shown, and is a delightful change from the ordinary haphazard method which seems to consist in having every piece in the room of a different color and style. Metals and metallic effects are largely used in wall and ceiling decoration. A large hall, with an ample fireplace, may have a decoration running through the various shades of copper and red gold, much of the work being in the actual metals or in metallic paint. The walls and ceiling of a bed-room, which would be especially cool and dainty for summer use, might be covered with a stenciled design in blue and silver, with silver picture mouldings and curtain poles. A beautiful portiéré for this room might be made of antique blue silk sheeting with a dado of applied discs in plush of two shades of blue, one darker and the other lighter than the hanging itself, set against a cobweb embroidered in silver. A good arrangement of copper and green bronze is seen in a library where the furniture is of mahogany covered with green leather.

MARTHA HOWE-DAVIDSON.

VENTILATION OF THE WASHINGTON SCHOOL, CHICAGO.

The Washington school is one of the largest schools in the city and was built about ten years ago. It has twenty rooms and accommodates about twelve hundred pupils. The temperature of the outside air on the day of visitation was 22°. The wind was blowing mildly from the west. The building is heated by driving fresh air over steam coils by means of a fan. The first visited was the fourth floor, northwest room; the temperature was comfortable because the warm air was entirely closed off. On request, the teacher opened the hot-air supply and the temperature rapidly rose to points varying from 70° to 92°, according to the location of the thermometers. It was designed that the foul air should be removed from the room by flues leading from the bottom floor to the garret, three for each of the four series of rooms, and five for some smaller rooms in the central portion of the east and west sides, On placing the anemometer before each of the openings to the three flues in the room visited, there was no perceptible current through two of them, and only a slight movement through one, which had a steam coil partially across its face. The other rooms visited were found to be in the same condition. In some of them the air was decidedly foul and bad smelling. There was absolutely no ventilation save by opening windows The engineer and the superintendent were uninformed as to the cause of the failure of the ventilating-flues to act and were surprised to find them useless, as they had supposed them to be accomplishing their purpose. The representative of THE SANITARY NEWS asked to be allowed to visit the garret where the flues were supposed to enter. The tops of all seventeen flues were found tightly covered with boards heavily weighted down with bricks to prevent, if possible, any foul air from making its escape. The boards were covered with the accumulated dust of several years. The motive for covering the flues was a mere conjecture, as neither the engineer nor superintendent had ever been cognizant of the proceeding. They may have been placed there by the masons and carpenters to prevent obstructions falling into them, or they may have been placed there by some engineer to save coal during an excessively cold season. It is needless to say that the coverings were quickly removed, and the long inactive flues began to pass air out of the rooms as well as can be done by such a faulty system.

Each room, instead of having three flues in common with three other rooms, should have a separate foul-air shaft, which should not be connected with any other room. This could be cheaply accomplished by using the same flues as are in use at present, for the three lower rooms, using one flue for each room and closing the entrance from the other rooms The flues are large enough to permit of this, provided heat is introduced into them, and the ornamental iron scroll registers are removed from the openings and a wire screen substituted. A flue could be easily constructed for the fourth-floor room. The flues which now empty into a common room, or garret, and are very liable to be subject to back-drafts, should be lengthened by tin flues which should pass through and above the roof entirely distinct from each other. If these recommendations are carried out, the Washington school will be much better ventilated than it is now, and the system will not be liable to reverses. THE SANITARY NEWS is not informed who may receive the blame for allowing this large school, with its vast numbers of young pupils, to become

a foul box of personal uncleanliness, but whether it be the sanitary committee, or some official connected with the board of education, or the school, the evil is one deserving the censure of all patrons of the school.

APPARATUS FOR SECURING WATER ON UPPER FLOORS.

Any one who has lived, or occupied offices, on the upper floors of high buildings knows what difficulty there is in obtaining water at all hours, unless it is drawn from storage-tanks. The ordinary open tank has serious objections, in that it becomes a receptacle for dirt and refuse, and vermin. It is not an uncommon thing for rats to drown in these tanks and their decomposing flesh pollutes the water to a point of serious danger. Not long ago the water ceased suddenly to flow from a large tank in a prominent building on Dearborn street, this city. The remains of a rat were taken from the mouth of the outlet pipe, which had become completely choked. Usually tenants must depend for their water on upper floors, upon the city pressure. This is so reduced during the day that no water can be drawn from the faucets; it is only at night that water can be obtained at all. Even when water can be drawn under ordinary circumstances, the opening of a faucet on the same line of pipe below will check the flow to the faucets above.

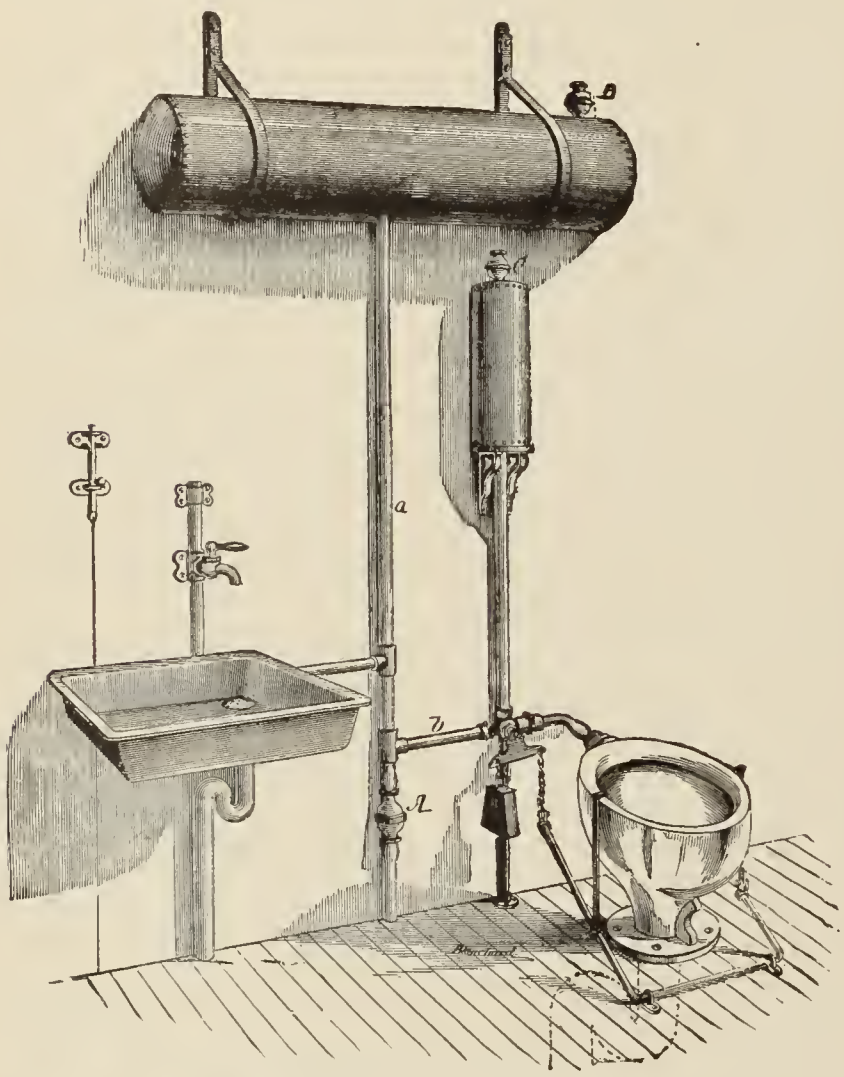


Fig. 1.—Water-Supply for Upper Floors.

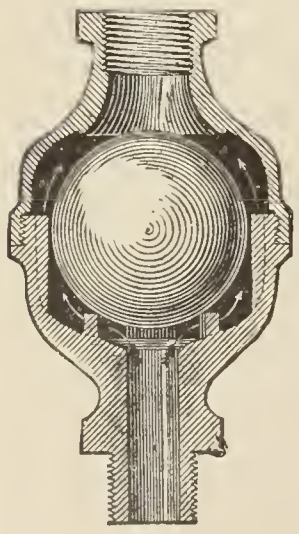


Fig. 2.—Air-Vent and Check Valve.

A device for overcoming these difficulties is shown by Messrs. Thos. Kelly & Bros., of this city. In Fig. 1, the tank is the ordinary kitchen boiler—a close tank. It is supposed to be filled at night, or intermittently during the day, through the service pipe *a*, by direct pressure. The water passes, in its upward movement, through an automatic check valve, at A, a sectional view of which, reversed, is shown in Fig. 2. The ball is made of rubber; is lifted by the upward pressure, while the water passes around and above it, and immediately falls into place when the back pressure becomes greater, checking the backward flow. This valve is used as an air-vent at B, on the supply-tank, and at C, on the flushing-tank, but reversed in position. The ball is raised by the water as it fills the tank, closing the orifice, which serves to release or admit air, when open. Clean water is thus always ready for use—the amount, of course, being regulated by the size of the storage-tank. The valve is shown in the second figure as used as an air-vent at B and C. By this method the ordinary overflow-pipe connected with the drain is dispensed with, the use of the overflow-pipe with the open tank, as everyone knows, being a serious objection. It is noticed that one pipe now takes the place of three. The valve can be used horizontally as well as vertically, and sand or grist is said to have no effect on the ball.

SOME FEATURES OF A NEW HOTEL.

The Hotel Buchtel, at Akron, O., offers some new ideas in construction and fitting which may be interesting. The building is located on a corner, and is five stories high. There are twelve suits of rooms with baths and wash-stands, five bath-rooms in the barber-shop, and two baths for male and female servants. The gentlemen's wash-room is supplied with a battery of seven National water closets and five self-syphoning urinals with high marble backs and divisions and slate floor. The cisterns to the closets are located in a room back of the closets, to avoid the condensation of vapor dropping on the head of the user. The wash-room has a six-bowl slab with high back, and is supplied with a tile floor, the fixtures being set free from woodwork. There are two water-closets for servants in the basement. Each bed-room floor is supplied with two of Jenning's closets for ladies' use, and there is also a gentlemen's closet on each bed room floor. A novel and very necessary feature is a wash-room for lady guests, where ladies who take meals only may prepare the toilet without taking a room. Wash-rooms are supplied for the servants on each floor and in the basement, and there are covered and ventilated slop-sinks on each floor. Each floor has a clothes-drop to the laundry. The kitchen is supplied with four sinks, Alling's patent dish-washer, and floor wash-sinks, which are trapped underneath, as are all fixtures, with Bower's traps. The bar and barber-shops are unusually well furnished. The office drinking-fountain is supplied by a coil of pipe which passes through the meat refrigerator. The hydraulic passenger elevator is furnished with a tank so that the water is used a second time. All soil-pipes run through the roof, and all fixtures are ventilated and supplied with safe-wastes. The cocks used are new patent automatic and self-closing. The building is supplied with a steam freight elevator, a twenty-five horse-power engine, and is heated by two steam boilers, and lighted throughout by electricity. The steam-heating and plumbing were put in by Mr. John Robb, of Akron, and cost $12,000. The architect of the building is Mr. Frank O. Weary, of Akron, and the estimated cost is $95,000. The hotel will be opened in April. So far as was possible, all pipes are in plain sight.

OUR HOMES AS THEY SHOULD BE, AND OUR HOMES AS THEY ARE.

Dr. William F. Sheehan, health officer of Rochester, N. Y., recently delivered a lecture on the above subject, before the academy of science. He described the precautions which should be taken in selecting a site for the building; the stagnant subsoil water must be drained off, and foul emanations from decomposing organic matter excluded. He described the movement of ground-water. As a rule, the soil of Rochester needs no underground drainage. He stated that in a house on Ford street diphtheria and other diseases prevailed, and the neighbor's privy-vault was found situated close to the cellar walls and the contents oozing out. Ground-air and ground-water were closely related, but ground-air was the most important. The movement of ground-air was due to the rise and fall of the ground-water, the diurnal range of temperature, and the wind. Three ways were described to combat ground-air: (1) By the rapid removal of waste and all decomposable substances from our houses and adjacent lots, and by the total abandonment of two abominations, the privy-vault and cesspool for the storage of excrement. (2) By the planting of trees, either on our premises, or, better, in aggregate in large parks, which should abound in every city. (3) By treating the cellar bottoms with impervious preparations. To render cellar bottoms impervious to ground-air, he recommended a layer of stone chippings, set edgewise; over this, a layer of coarsely broken stone; next, a layer of coarse gravel; next, a mixture of water-lime and coarse sand, and, over all, a coating of water-lime and fine sand, extended up the cellar wall quite a distance.

THE DRY EARTH SYSTEM.

CHICAGO, Feb. 21, 1884.—(To The Editor.)—I want to call the attention of your readers to a paragraph in the February number of THE SANITARY NEWS, as to the fact that in Manchester, Eng., "sixty thousand old-style privies have been abolished in the last ten years and earth-closets substituted." Think of the condition of the soil under the former condition, completely saturated with poison, emanations from which were filling the air! Then, again, the positive advantage of the dry-earth system, over the water-closet, in the fact that that source of sewer-gas having been done away with, is of vast importance to the health of the city. Now, while it will not be possible in our cities, which have sewerage and hydrant water, to get rid of the water-closets, it is possible,—is essential,—that the public should be rapidly educated, in all other cities, towns and villages, to adopt the Manchester, or some similar, system of using dry earth to get rid of the abominable privy nuisance.

Do keep the subject before the people through your excellent journal, for it is one of the most important sanitary measures. L. P. H.

CURRENT PUBLICATIONS.

PARKE'S HYGIENE.

In the review of Wood's edition of Parke's Hygiene, which appeared in THE SANITARY NEWS in the issue for February, a statement was made that Frederick N. Otis made an error in his introduction to the American appendix in crediting the paper on ventilation by Mr. Warren R. Briggs, of Bridgeport, Conn., to the Michigan state board of health, when it should have been credited to the state board of health of New Hampshire. As a fact, the valuable article of Mr. Briggs was first published in the third annual report of the state board of health of Connecticut, and a portion used in an article on ventilation in the New Hampshire report, by permission of the Connecticut board. The article, in part or in whole, has been reproduced many times, as it illustrates a new method. The article was written at the suggestion of Dr. C. W. Chamberlain, secretary of the Connecticut state board of health. It is with pleasure that THE SANITARY NEWS gives the proper credit and places this article where it belongs; the Connecticut state board of health and its progressive secretary deserve credit, not alone for this, but for having published much other valuable sanitary literature, not the least valuable of which are the monthly reports of Dr. Chamberlain, which are widely copied.

A BACHELOR'S TALKS ABOUT MARRIED LIFE.

Rev. William Aikman's "Bachelor's Talks About Married Life," just published by Fowler and Wells, of New York, and for sale in Chicago by Jansen, McClurg and Co., is a book full of good, practical thoughts and sound common sense. The chapters on "homes," "taking and not giving," "politeness in the home," and "little courtesies," are especially praiseworthy. The author writes in a clear, pleasing manner, and the book is a most excellent work to be placed in the hands of young married people, and, in fact, it will prove beneficial and pleasant reading to all. It is very attractively bound in blue and gold.

FOR MOTHERS AND DAUGHTERS.

This book by Mrs. Dr. Cook, of New York City, opens with a chapter on the importance of physical culture, which is followed by chapters on the bones and muscles, the brain and nervous system, the structure and care of the skin, hygiene and ventilation and intemperance. A chapter is devoted to bread and butter, in which there is a careful analysis of the processes of digestion, in which this matter is made plain and practical. A large portion of the book is devoted to diseases to which woman are subject. The feeding of children, the rights of children, the question of education, etc., are all discussed, and the work is fully illustrated by a number of fine engravings. There is much need that knowledge such as is contained in this book should reach the persons for whomit is intended. Who is so able to communicate it to women as a woman?

MARYLAND STATE BOARD OF HEALTH.

This report contains several papers on sanitary subjects, including, also, the proceedings of the sanitary convention held in Baltimore in November last. The prompt publication of the papers read at the convention is much to be commended. The discussions are given in full, which are notable for their local interest, and the subject of sewage is especially well discussed.

THE CENTURY.

This magazine for March is worthy of commendation in every respect. Its articles cover the usually wide field, but an article in which the readers of THE SANITARY NEWS will be particularly interested is an "Old Public Building in America." Portraits are given of Von Moltke, and Henry Irving as Hamlet.

THE NORTH AMERICAN REVIEW.

The March number of this periodical contains a leading article by Judge J. A. Jameson, of this city. He discusses the question, "Is Our Civilization Perishable?" and concludes that it is. It may owe its death to convulsions of nature, "or it may perish from moral or moral-physical causes, which are now actually at work in some countries." Among other interesting articles are "Agricultural Politics in England," by Wm. E. Bear, and "How to Improve the Mississippi," by Robert S. Taylor.

THE POPULAR SCIENCE MONTHLY.

The number for March has, among the articles that will interest readers of this journal, a continuation of the series on "The Remedies of Nature,—Catarrh, Pleurisy and Croup." The author maintains that low temperatures, sudden transitions from heat to cold, and damp, or wet, clothes, have little if anything to do with the cause of "colds." The subjects of other papers are: "Study—Physically Considered," by Dr. P. J. Higgins; "The Chemistry of Cookery," by W. Mattieu Williams; "Fashion and Deformity in the Feet," by Ada H. Keply, etc.

PUBLICATIONS RECEIVED

"Report of the Chief Engineer of the Board of Public Works of the City of Cincinnati for the year ending Dec. 31, 1883." H. J. Stanley, chief engineer.

"Our Houses and Their Sanitary Arrangements." By E. L. The Midland Advertising and Publishing Co., 20 and 21 Cannot st., Birmingham, England. Price Threepence.

"Precautions to Use Against Small-Pox." Bowling Green, Ky.: State Board of Health, Dr. J. N. McCormack, secretary.

"Programme Annual Meeting American Institute Mining Engineers, Cincinnati, Feb. 19—22." New York; R. W. Raymond, secretary.

"Fifth Biennial Report of the State Board of Health of Maryland. Pam., p p. 275. Baltimore: C W. Chancellor, M D., secretary.

"Thirty years of Sanitary Progress in the Navy; Its Present Needs." Annual Address before the Naval Medical Society at the Museum of Hygiene, Washington, D. C., Jan. 4, 1884, by the President, A. L. Gihon, A. M., M. D., Medical Director U. S. Navy, President American Public Health Association, etc.

"Public Health Report for Year 1883, Pittsburgh, Pa." W. Snively, M. D., Registrar.

"The Architects' and Contractors' Catalogue of Materials and Manufactures." Edited by J. Douglas Mathews, Architect. Published Annually. Bradley Thomas, Batsford, 52 High Holborn, London, E. C., 1883.

"Thirtieth Report of the Births, Marriages and Deaths in the State of Rhode Island, for the Year Ending Dec. 31, 1382." Prepared by Charles H. Fisher, M. D., State Registrar of Vital Statistics; Secretary of the State Board of Health. Pam., pp. 178.

NOTES AND NEWS.

ANNOUNCEMENTS.

March 5, at Chicago, regular meeting of local Master Plumbers' association.

March 12 and 13, at Seymour, Ind., first convention of the Indiana State Sanitary Society.

March 26 and 27, at Beardstown, Ky., meeting of the State Sanitary Council, under the auspices of the State Board of Health.

April 17 and 18, at Hillsdale, Mich., sanitary convention, under the auspices of a local committee and State Board of Health.

August 21–27, at the Hague, fifth session International Congress of Hygiene, Dr. Overbeck de Meyer, secretary.

WATER-SUPPLY.

The water-supply of Dubuque is taken from an unknown source in a mountain, the original intention being to drain a mine. The water shows no sign of failure after twelve years use.

SEWERAGE.

The city of Dubuque, Iowa, has had Colonel Waring look it over with a view to sewering it, and the city of Freeport has had Benezette Williams and Chester B. Davis examine the conditions there for sewerage.

CHICAGO BUILDING NOTES.

Preparations are being made for the construction of the new Continental building, on Dearborn street, just south of the new Commercial Deposit building. This will be nine stories high, and built of Connecticut brown stone and pressed brick. The cost will be $225,000.

Architect Boyington will construct a three-story carriage factory at the corner of Clinton and Harrison streets, for H. G. McFarland, to cost $10,000.

Architects Adler & Sullivan have drawn plans for stables on Fourteenth street, near Michigan avenue, to cost $20,000.

The walls of the custom-house and post-office building in this city have settled to such an extent as to separate water and gas-pipes, and the tile flooring is continually becoming loose and uneven.

Preparations are being made for the construction of the new Armour-Kent office building, just south of the new board of trade building. This will be twelve stories high and contain about 350 offices.

OUTSIDE BUILDING NOTES.

An improvement to the extent of $10,000 will

be made to the Evanston, Ill., Presbyterian church, after plans by Architect Boyington.

Architects Eldrooke & Burnham, of Chicago, are the successful competitors for the new Georgia state capital.

MISCELLANEOUS.

The death-rate in the city of Pittsburgh, Pa., for the year 1883 was 19 per 1,000—lower than for any year since the organization of the health department

A bill is before the Ohio legislature to authorize the village of Marysville to construct gas-works; also, to permit Holmes county to build a court-house.

SANITARY ASSOCIATION NEWS.

OHIO STATE SANITARY ASSOCIATION.

At Columbus, Feb. 14 and 15, 1884.—(From The Sanitary News Special Representative).—It is largely due to the untiring energy of Dr. R. Harvey Reed, of Mansfield, that the first meeting of the state sanitary association is a matter of record. The convention was called to order on Thursday morning in the board of trade room of the city hall, with an attendance of about thirty gentlemen from different parts of the state. The master plumbers' association of Cincinnati was ably represented by Messrs. James Allison, James Semple, and Thomas McNeil. The meeting was opened with prayer; Dr. William M. Beach, of London, was made temporary president and Dr. Reed was elected temporary secretary. Dr. J F. Baldwin, of Columbus, delivered a brief address of welcome, which was responded to by Mr. John Simpson, of Mansfield. Dr. Beach read a paper on the importance of sanitation. A letter from Dr. James E. Reeves, secretary of the state board of health of West Virginia was read, the writer regretting that the disastrous floods prevented his attendance. Dr. G. S. Franklin, of Chillicothe, read a brief but interesting paper on abattoirs, recommending their establishment in smaller cities. At the afternoon session, a proposed bill to establish a state board of health and board of medical examiners was read by Dr. X. C. Scott, of Cleveland, an abstract of which will be found in the columns devoted to current topics. The bill was in the main warmly supported by the association. An interesting paper on the sewerage and water-supply of Youngstown was read by Dr. John McCurdy, of that city. It, with a paper on the plumber in his relation to sanitary progress as viewed from the college of practice, read by Mr. James Allison, of Cincinnati, will be published in the columns of The Sanitary News. By invitation of the house of representatives the evening session was held in their hall. The evening's programme was a general discussion on the resolution that legalized state sanitation has become a necessity in the state of Ohio for the general protection of its citizens, which was opened by Dr. Starling Loving, of Columbus, followed by Dr. McCurdy, of Youngstown, and Dr. Reed, of Mansfield. A paper followed on the influence of school-life on the building of a brain. At the session Friday morning a constitution was adopted and the following permanent officers elected: President, Dr. William Morrow Beach, London; vice-presidents, Prof. Edward Orton, Columbus; Prof. Nelson, Delaware; L. D. Brown, Hamilton; secretary, Dr. R. Harvey Reed, Mansfield; treasurer, John Simpson, Mansfield. Dr. Curtis Howard, of Columbus, read a paper giving the results of fifty-four analyses of milk sold in Columbus. Fifteen samples were excellent; twelve were good; twelve were medium, and fifteen were poor. Dr. D. N. Kinsman, of Columbus, read a paper on some reasons for the establishment of a board of health. Dr. C. A. L. Reed, of Hamilton, read a paper on the new fashion, urging a more complete education of the mind and body. A paper on blood poisoning from a sanitary stand-point was received from Dr. F. H. Darby, of Morrow, and was read by the secretary. Dr. D. H. Beckwith, of Cleveland, read a paper on sewerage and sewer-gases, which will be published in full in The Sanitary News. The meeting adjourned with a few remarks by the chairman, congratulating the members of the association upon the very successful result of the first meeting, and it was decided to meet in Columbus next February.

AUXILIARY SANITARY ASSOCIATION.

At New Orleans.—The flushing committee report that the drainage committee of the city council has submitted an ordinance calling for an appropriation of $45,000 for repairs to the draining machines and improvements to the canals. The association has appropriated $300 to clean the central portion of the city. It was reported that the council would be ready on

[Continued on page vii].

SANITARY APPLIANCES.

[*Under this head* The Sanitary News *will publish, in each issue, a complete record of all the latest patents of sanitary appliances issued at the United States patent office. Cuts will be reproduced of such as seem to have special merit. Single copies of printed specifications and drawings of any patent will be forwarded by* The Sanitary News *on receipt of twenty-five cents.*]

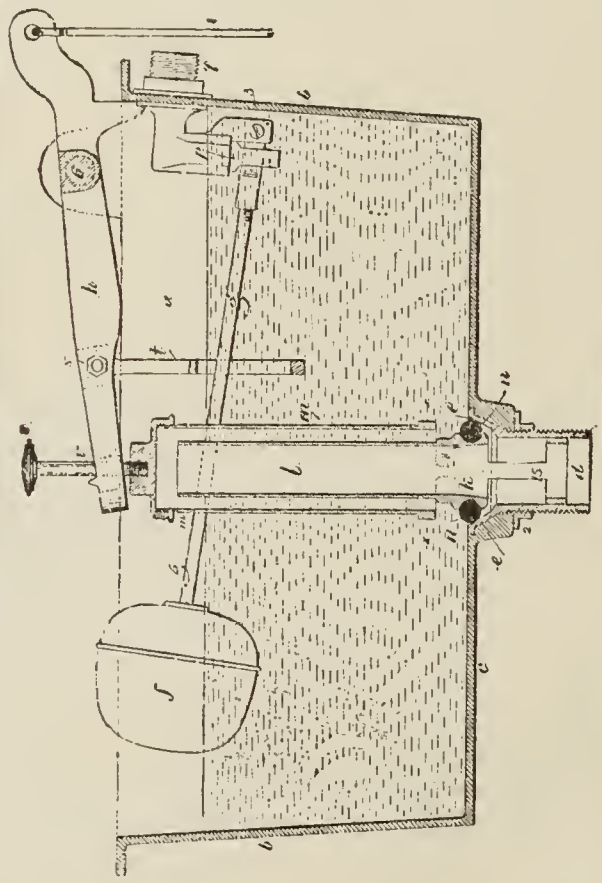
292,824. Stop and Waste-Cock. John H. Kennedy, Cleveland, O. Filed Aug. 2, 1883.

This is provided with laterally-projecting stops and a plug-valve, a cap adapted to be removably secured to the projecting end of the plug-valve, and provided with an angular upper end for the attachment of a removable key or other suitable device.

292,887. Tile or Block for Finishing Inside Walls. James Austin, Detroit, Mich. Filed Aug. 1, 1883.

The block is formed of cheap plastic material, with an outer facing of calcined plaster; provided with projecting lugs and recesses.

292,901. Cistern for Water-Closets. John Demorest, New York, N. Y., assignor to the J. L. Mott Iron Works, same place. Filed July 21, 1883.



The tube *m* is supported by and surrounds the tube *l*, having an opening at the bottom, but none at the top. At the bottom of the tube *l* is a ring of rubber or other elastic material

292,912. Water-Filter. John E. Heath, Albany, N. Y., assignor of one-half to Henry L. Smith, same place. Filed Aug. 16, 1883.

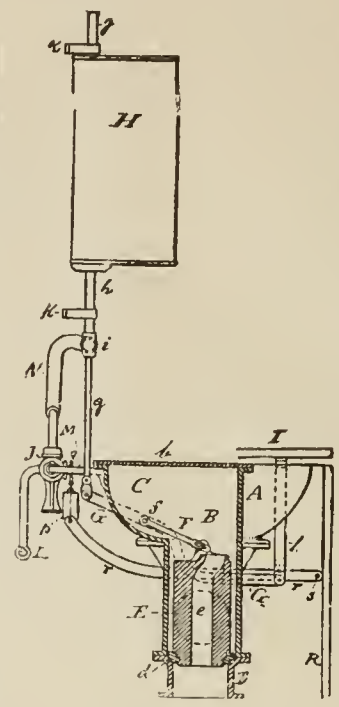
293,025. Radiator for Hot-Air Furnaces. Cyrus S. Hood, Corning, N. Y. Filed Sept. 25, 1883.

293,027. Combined Stop-Box and Fresh-Air Conduit. Lewis O. Howell, Jr., Philadelphia, Pa. Filed July 16, 1883.

293,043. Draft-Regulator for Pipes, Flues and Ventilators. Lewis Young Lenhart, Red Wing, Minn. Filed Dec. 24, 1881.

293,056. Cooking or Heating Stove. John S. Miller, Newark, N. J. Filed April 20, 1883.

292,918. Water-Closet. John Kelly, Chicago. Filed March 17, 1883.



The vertically-movable service-tank H is so arranged as to operate the soil-valve, or plunger, E, by its differential gravity. The tank H and plunger E are so arranged upon and supported by the arms G and F of the lever operating on the shaft *f*, that the tank, when empty, is lifted by the greater gravity of the plunger; but when filled, the tank will overbalance and lift the plunger. The tank is filled and emptied automatically through the Kelly stop and waste-cock.

292,937. Open-Fire Stove and Heater. Alonzo R. Morgan, New York, N. Y. Filed Dec. 5, 1882.

292,953. Cesspool-Well. William Rowbottom and John M. Rowbottom, Allegheny, Pa. Filed June 22, 1883.

293,057. Stove. John S. Miller, Newark, N. J. Filed April 20, 1883.

293,106. Drain-Tile Perforating Machine and Perforated Drain-Tile. Hiram P. Stafford, Decatur, Ill. Filed July 11, 1883.

293,175. Pipe-Wrench. James Jewell, Grandville, Mich., assignor of one-half to George Frazer and John J. Fidler, both of same place. Filed Aug. 27, 1882.

293,207. Manufacture of Artificial Stone. Rudolf C. Wittmann, New York, assignor to himself and Charles Nelson, East New York, N. Y. Filed July 12, 1883.

293,214. Asphaltic-Concrete Conduit. William W. Averell, Bath, N. Y. Filed May 26, 1883.

293,243. Direct-Acting Duplex Pumping-Engine. Robert W. Hamilton, Hartford, Conn, assignor of two-thirds to Marshall T. Davidson, Brooklyn, N. Y. Filed Sept. 8, 1883.

293,258. Furnace Fire-Grate and Frame. Horace W Loveland, Topeka, Kan. Filed May 21, 1883.

293,259. Vapor-Stove. Fordyce Allen Lyman, Cleveland, O. Filed Sept. 1, 1883.

293,260. Apparatus for Heating and Ventilating Buildings. James H. Manny, Chicago, assignor to the Richardson & Boynton Company, of New York. Filed July 23, 1881.

293,275. Urinal. Albert B. Pullman, Chicago. Filed March 2, 1883.

293,296. Stove-Grate. Edgar W. Anthony, Boston, Mass. Filed May 14, 1883.

293,305. Attachment for Water-Closets. Luther H. Burnett, Chicago. Filed April 4, 1883.

A chamber arranged at the side of the water closet contains a chemical, through which water flows, and thence to a box beneath the chamber containing charcoal. The liquid then passes through a perforated bottom to the soil-pipe above the water in the trap under the water-closet. Provision is also made for the escape of the gases from the soil-pipe below the trap, to escape into the box of charcoal.

293,385. Weather-Strip David Warnock, Olathe, Kan. Filed Aug. 23, 1882.

293,413. Weather-Strip. Gustav Burkhardt, Homer, Ill., assignor of one-half to Charles E. Wolfkill, same place. Filed Dec. 5, 1883.

293,434. Incandescent Electric Lamp. Thomas A. Edison, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York, N. Y.

Current Topics.

The attention of readers of The Sanitary News is asked to the editorial pages, which have comments on the ice-supply, milk-supply, gas, water, the different contagious diseases, the Desplaines river, etc.; the sewerage of Chicago and the sanitary administration of Sweden are concluded; papers on sewerage and sewer-gases, the plumber in his relations to sanitary practice, and the drainage of New Orleans are especially interesting. A very important suggestion is made in an article on the construction of high buildings. An illustration is given of the arrangement of hot water-pipes in dwellings. The usual departments of the house interior, current topics, notes and news, sanitary association news, and sanitary appliances are fully represented.

Ice is getting to be a staple merchandise, and there are evidences on every hand of the extent to which it is gathered for shipment as one travels through the northern country on any of the lines of railway. Many of these ice store-houses are located upon lakes of fair size, apparently uncontaminated by fecal, or organic, matter. There are others, however—and there are many of them,—which contain ice utterly unfit for human consumption. One particular ice-house, near a large city, is especially to be condemned. The stream from which the ice is obtained in winter is a narrow and shallow one, and has been observed as a favorite resort for the ducks and geese of the neighborhood. This is easily accounted for by the fact that the bed of the stream is covered with a rank growth of water-plants. There are reasons enough in the above description, why the ice from this semi-stagnant stream should not be used. Large store-houses have also been noticed on small bodies of water collected in a natural basin, without inlet or outlet. If dealers south, or in large cities, are obliged to purchase ice from country store-houses, it is due their patrons that some inquiry should be made as to the source from which it is obtained.

The examination of plumbers and sewer-builders before permitting them to practice has been recognized by the better portion of the trade as the best way to keep out ignorant and vicious work. The accomplishment of this examination, if The Sanitary News mistakes not, is, however, not a fact in any city in this country. The action of the master plumbers' association of Cleveland, which will be found under the head of sanitary association news, in this issue, in endeavoring to secure such a board of examiners, is, therefore, pioneer in its nature, and deserves the thanks of other associations. The personnel of the board, as requested by the association, is important,—the city civil engineer, the engineer of the water-works, the health officer of the city and one master-plumber. Such a board as this would do justice to an applicant, and would benefit the people at large by securing competent workmen.

Milk and its adulteration is justly attracting a great deal of attention from our more advanced sanitary authorities. The state of New Jersey seems to be in advance of all others. The laws of that state, to detect and prevent adulterations, are the most complete of any in this country. The practical outcome of these laws has not been to oppress the milk-sellers, but exactly the reverse. The farmers were unable to realize a paying price for milk, because the counties adjoining New York city were flooded with skimmed-milk sellers. In 1879, one forty-quart can of milk brought, in the whole year, $340.60, while in 1883, the same amount brought $474.80. The poor milk has also been driven out of the market. The standard of purity requires that milk shall not be sold which contains less than twelve per cent of milk-solids. As the standard has been questioned as to its correctness, a series of eighty-five analyses have been made of milk from common cows, fed with miscellaneous food. All showed over twelve per cent of total solids.

Mansfield, Ohio, is to make the beginning of a system of sewers, and presents some of the peculiar problems which beset towns of interior location. The sewers are most needed, or, perhaps, most desired, to drain the subsoil and relieve the cellars of store-buildings of water. It is a question whether the subsoil water should not be drained by conduits constructed especially for the purpose, or whether the combined system should be adopted. The method of disposal is to be by leading the drain into a small stream, four or five feet across. It is recognized that, should the drain become to any great extent a receptacle for sewage, the stream will not carry away the solid matters. This fact militates against the combined system, for, with such a system, there is no other method of disposal which can be so economically carried on as to discharge it into a moving body of water. Hence, if the stream cannot carry away the sewage, it will have to be disposed of by infiltration through the soil, or by the manufacture into a fertilizing material, neither of which can easily be done when the sewage is diluted with a large body of water.

Dr. C. W. Chamberlain, secretary of the Connecticut state board of health, reports that in Hartford, in 1883, there were two hundred deaths from diphtheria and two hundred and thirty-four from croup and diphtheria, "now generally classed together." The total mortality to date (including the month of January, 1884,) was two hundred and seventy, larger than the number of deaths for the whole state for some years, and, excluding the cases of croup, equal to the deaths from diphtheria in 1879 in the whole state. The increase in the mortality from diphtheria in Hartford is certainly alarming; in 1882 it was only forty-seven, or sixty-three from both croup and diphtheria. Dr. Chamberlain observes that such epidemics as the one now prevailing are found associated with unsanitary conditions. He further says that an ordinance embodying the opinions of the city board of health upon some of the causes that can be remedied, which are also favorable to the spread of zymotic diseases generally, has been submitted to the common council for action. The doctor looks upon the unusual prevalence of diarrhœal diseases as a singular feature, and expresses the opinion that should this continue it would be an intimation to look out for cholera next summer. He urges that "it is a bad time to clear up filth when an epidemic is present. The time, if prevention is to be accomplished, is before the appearance of the disease."

One of the sanitary signs of the times is the recent discussion of the city board of health of Davenport, Iowa, regarding the desirability of an organization among plumbers. It is not long since the board of health authorities and plumbers were almost at warfare. Now that they are coming together in considering what is best for the health of their communities, is a sure indication that the sanitary welfare, especially of our cities, is to be improved.

The Sanitary News has repeatedly called attention to the fact that the efficiency of the Bridgeport pumping-works, this city, was continually weakened, if not destroyed, by the flow of water from the Desplaines river into the Chicago river. Invariably in the spring, and at times of high water during the year, the Desplaines overflows its banks, and its water finds its way to Lake Michigan. This in itself is no serious matter, were it not for the fact that the Chicago river is scoured by this excessive flow, and the sewerage of the city swept out toward the crib. The city authorities look placidly on and continue in operation the pumps at the head of the canal, but nothing is accomplished except a waste of time and money. The citizens' association has called the attention of the city council to this matter, and urges that attention be given to it. The committee says: "The consequence is that the Bridgeport pumps, designed for the purification of the Chicago river, are, for several months in the year,—and those in some respects the most important from a sanitary point of view—compelled to pump, principally, Desplaines river water, to the neglect of that which they were designed to relieve. That water, also, deposits a considerable amount of silt in the Chicago river and in the canal when so pumped; when the pumps are stopped, the foul water of the Chicago river is carried into the lake, to the detriment of the household water-supply." The committee points out the remedies, which are to the effect that an embankment could be raised of sufficient strength to hold back the waters of the Desplaines river, except at a period of perhaps two weeks in the year, when the water gates could be raised and the Desplaines river allowed to flow into the Chicago river. The cost of this undertaking would be about $6,000. The city council simply refers the communication of the citizens' association to the commissioner of public works, who, in turn, simply says that it is all very desirable, but he has no idea where the money is coming from. The probabilities are that the pumping-works will continue their useless pumping, that the river will be overflowed as usual, and that the water-supply will be contaminated by sewage.

In a recent communication to the city council the commissioner of public works accepts the facts as stated by the citizens' association, except as to effects of the overflow into the Chicago river, on the pumping-works and the contamination of the water-supply. He believes, however, that to construct a dam as proposed would cause the overflow of a large tract of land in the vicinity, and be apt to subject the city to suits for damages. He hints at another plan, which would be more effectual but perhaps more costly. It is time that something more was done than to talk about this matter.

The course of the Desplaines river through Cook county is nearly north and south. At the "summit," twelve miles southwest of the court-house, the river runs through a rocky bed, which is about nine feet higher than the bed of the Chicago river. As the banks of the former river are low, through this rocky formation, they readily overflow at times of high water, and formerly made what was known as Mud lake, near the "summit." About thirteen years ago, for the purpose, presumably, of reclaiming this land, the late Mr. Ogden constructed what is known as the Ogden ditch, extending from the west fork of the south branch of the Chicago river and terminating in a bayou, or slough, of the Desplaines. The purpose for which the ditch was constructed was abandoned, but the ditch was not closed up; the result was that the course of the Desplaines was changed for the greater part of the year, as to the greater portion of its volume, which passes through the Ogden ditch and so into the Chicago river, bringing with it the washings of the soft soil, and enlarging the ditch from time to time. The ditch has, in fact, become a regular stream, and is used as a drain or sewer to some extent by the inhabitants of the town of Cicero. Mud lake has also dried up. Some years ago, Mr. Chesbrough, while city engineer, caused a dam to be constructed at the end of the Ogden ditch, where it connects with the bayou of the Desplaines river, to keep the water of the latter back and cause it to pass down its proper channel. But the earth at the south end of this dam washed away, and, ever since, the water of the river has been allowed to pass through the ditch. The present proposition is to repair the breach referred to and build an embankment one hundred and eighty rods long, of sufficient strength to keep back the Desplaines. With water-gates at the slough, or bayou, the water of the Desplaines could be allowed to pass through when there are freshets or unusual flows. Again it may be repeated, the importance of some action in this matter is indicated when it is known that for eight months in the year the Bridgeport pumping-works are employed in pumping only, or mostly, Desplaines river, instead of Chicago river, water. In view of the obstinacy of the city officials, and the depleted condition of the city treasury, cannot the citizens' association, composed as it is of the wealthy men of the city, raise the money necessary to make this improvement, and do it at once? As business men they can hardly afford to allow any contamination of our river, and water-supply, this summer, when the city will be visited by so many strangers.

Sawdust, as it is disposed of in Michigan and other lumbering states, has often been accused of being harmful to public health, but the exact methods in which it is hurtful have not been discovered. There are now being made, by reliable chemists, analyses which will show in what manner the deposit of sawdust affects the water-supply as found in wells, streams, etc. When completed, these analyses will be printed in full in The Sanitary News.

The proposition made by Mr. Wade, at the last meeting of the Chicago master plumbers' association, that steps be taken to purchase a lot and put up a building for the use of the association, is a pronounced indication of the strength of the association and the progress it is making. There is good reason to believe that the undertaking would prove a financial success, as well as give the association the rooms which it so much needs, for the use of a permanent library, show-rooms, laboratory, etc.

A good water-supply is an actual necessity in towns where the habitations of men are gathered so closely together as to permit the pollution of the soil by excrement. Sandusky, Ohio, has a water-supply derived from Sandusky bay, a tideless estuary of Lake Erie, the crib being located only eighteen hundred feet from the shore where the sewerage of the city of twenty thousand is emptied. The danger of continuing this water-intake so near the sewage-outlet is already recognized by the authorities at Sandusky, and it is proposed to continue the tunnel across the bay and construct a filtering basin on the sandy shore of the lake proper, and secure a purer supply by allowing the water of the lake to filter through its own gravel-bed into the basin. Lansing, Michigan, is developing a water-supply with the intention to provide a public supply. The test-well supplies two hundred and fifty gallons per minute, and the chemical analysis by Prof. R. C. Kedzie shows the water to be of good character. The engineer who secured the supply, believes it to be better protected from contamination than any supply he has developed.

The mistake is quite sure to be made by the city council of cutting down the appropriations for the health department this year to an extent which will endanger its prosperity. Money is wisely spent in keeping clean ; and surely no one can deny that Chicago has suffered, and is suffering from filthy streets. Some of the outlying wards, which are becoming rapidly settled, need more sewerage urgently, and as the city increases in population it requires more money for scavenger work. The comptroller cut down the estimates made by the departments, but now the finance committee has done closer pruning. If the figures must be made smaller, to keep within the city's resources, let the health service suffer last and least.

Supplies of natural gas are being developed with surprising frequency. Mr. J. H. Wade, of Cleveland, is now completing a second natural gas well, the pipe being fourteen hundred feet in the ground and the supply being sufficient to heat his residence and supply fuel for cooking.

There is decided earnestness among plumbers throughout the country in the matter of sanitary reform. It is a matter of course that the associations which have been organized throughout the country should have an eye to their business welfare ; but that this is the sole object of these organizations is by no means true. Those who have followed the reports of the meetings of the association in this city are certainly convinced of this. Those who have attended the meetings regularly, not members of the association, have been impressed with the enthusiasm manifested toward lifting the craft out of the rut of mere money-getting, and acquiring scientific skill. The aim has been to drive out of the ranks dishonest and unskilled workmen; from the first, plans have been pursued to secure a library and books, a laboratory and its equipments, and a show-room with all the different articles of plumbers' ware on exhibition, and to discuss matters which would benefit them in their work. As a further indication of the truth of what has been said, reference may be made to the paper which was read at the first meeting of the Ohio state sanitary association by Mr. James Allison, on the subject of the plumber in his relations to sanitary progress, as viewed from the college of practice. This paper is published in another part of this journal, and is well worthy of the attention of every reader. Mr. Allison is a practical man, and his views are valuable on that account. As repeatedly stated by The Sanitary News, the public has an interest in the plumber, not only because his services are required in mere mechanical construction of water-pipes and drain-pipes, but because he is an important element, perhaps the most important, in the advancement of sanitary science.

At the time of the meeting of the American public health association at Detroit, last November, it was decided to call a meeting of the secretaries, or other representatives of state boards of health, to be held in Washington next May. The purpose of the conference was to consult with reference to general plans and special lines of practical work, and with a view to the organization of a section devoted to state board work in the American public health association, or the formation of a permanent organization, especially adapted to the needs of state boards of health. There were two reasons for holding the meeting in Washington in May,— the American medical association meets there at that time, and, as congress will also be in session, it will give the representatives of the state boards an opportunity to confer with members of congress from their respective states, in regard to sanitary legislation. It is believed that much good will result in agreeing upon a general course to pursue in respect to yellow fever, cholera, scarlet fever, diphtheria, or any disease that endangers public health, without regard to state lines or borders; considerable progress will have been made in solving the problem of what are the best methods for national legislation in regard to inter-state and maritime quarantine, or inspection and disinfection, as well as in the practical control of epidemic disease within the several states of this country. There is believed to be a constantly increasing need for an annual conference of state and other health officials in regard to practical affairs of this every day work. Discussions can be more profitably had among a few directly interested in these matters, than in a public meeting consisting largely of persons not familiar with its details, and not directly responsible to the people, for the best possible care for the safety of their health and lives. Drs. Henry B. Baker, of Michigan, and J. N. McCormack, of Kentucky, were appointed a committee to confer with and secure the co-operation of all the state boards in fulfilling the object of this meeting. These gentlemen have just issued a circular to state boards requesting them to appoint a delegate to this meeting, with full authority to act for the board which he represents. The committee hope that each delegate will be prepared to present specific subjects on which there is need for comparison of views, or for co-operation, and to express his own views and practically the views of his board. It is also suggested that each delegate prepare a brief paper for presentation at the meeting, in which he will be prepared to express himself clearly and concisely. This is an important matter, and should receive the prompt attention of every board, and hearty co-operation. The first meeting will be held at Washington on the second day of the session of the medical association.

CHICAGO SEWERAGE—SPECIFICATIONS.—XXII.

SPECIAL AND GENERAL REQUIREMENTS.—(Continued.)

The contractor is required to dig all stake-holes necessary to give the lines and levels for the work, in time for the daily visit of the assistant engineer in charge, at such time as he may appoint. All railroads not required to be taken up must be kept in constant running order, and they must be left, after the completion of the work, in as good condition as they were in before its commencement by the contractor. No allowance is made for delays, or other damages, occasioned by the necessity of keeping the railroads in constant running order, or for removing or replacing them, when it is necessary to do so.

No claims for extra labor or materials furnished by the contractor are allowed, unless ordered in writing by the commissioner of public works, or an authorized officer of the department, and all claims for damages for any cause whatever, must be reported to the inspector on the work at the time that such damages occur; and such claims must be presented to the engineer in charge of the work, at the end of the same month, by the contractor, otherwise the department is not bound to pay any such claims.

If, for any cause, the commissioner of public works finds it necessary or desirable to suspend operations for any considerable length of time, the contractor must acquiesce, on due notification; and he is not entitled to any damages, of any kind, because of such detention. He is, however, allowed further time in the completion of his contract, equal to the delay caused by the suspension of the work.

Any contractor who fails to employ a sufficient force of competent men to complete the work he undertakes by the time specified, may be dismissed by the commissioner, who is, in such case, authorized to complete the work at the cost of the contractor.

Any bidder to whom a contract may be awarded, who fails to appear at the office of the department of public works, either in person or by his agent, within two days after being addressed, through the post-office, or, within three days, to furnish the required security, forfeits his claim to the work.

The commissioner reserves the right to reject any proposal at his discretion.

No contractor is allowed to sub-let the whole or any part of his work, or make an assignment of the moneys to be paid him, without special permission, in writing, from the commissioner; and each contractor is required to give his personal attention to the work.

All of the work is commenced and carried on at such times, and in such places, and in such a manner, as the commissioner of public works shall direct.

Monthly estimates are made by the commissioner of public works of the value of the work actually constructed and in its permanent place; and on or about the sixth day of each month, vouchers for 85 per cent of the estimated value of the work done the previous month are issued, the remaining 15 per cent being reserved until the completion of the whole work.

The commissioner of public works reserves the right to make any changes in the plans and specifications that he may deem desirable or necessary; and the contractor must furnish any additional materials and do any additional work required by such changes, at the rates the department shall determine to be just.

In accordance with an ordinance passed by the city council, March 10, 1879, the commissioner of public works reserves the right to refuse to issue a voucher, and to direct that no payments shall be made to the contractor, in case he has reason to believe that the contractor has neglected or failed to pay any sub-contractor, workman or employé for work performed on or about any of the sewers included in the specifications, until the commissioner is satisfied that such sub-contractor, workman or employé has been fully paid.

After the full completion of the work, to the satisfaction of the commissioner of public works, he reserves the right, in accordance with the ordinance of the city council, to refuse the payment of the 15 per cent reserved, or any amount due the contractor for work, until he is satisfied that all sub-contractors, workmen and employés of the contractor have been fully paid.

The commissioner also reserves the right, after ten days' notification of the contractor, in accordance with the provisions of the ordinance, to apply the money due, or that may become due, under the contract for the sewers included in the specifications, to the payment of such sub-contractors, workmen or employés of the contractor, without other or further notice to him of the intention so to do.

The failure of the commissioner of public works to comply with the provisions of the ordinance in regard to unpaid sub-contractors, workmen or employés, does not affect the liability of the contractor, or his sureties, to the city or to the persons who are or who may have been in his employment.

Parties bidding for the work must do so in accordance with a form of proposal furnished by the commissioner.

The actual length of each sewer to be built, may be more or less than the corresponding length given in the proposal and the specifications; but no variation is made in the rate on that account.

No claims for an amount of money beyond the contract price for the work are entertained or allowed on account of the character of the ground in which the trench or other excavations are made, except for rock-cutting heretofore specified. The contractor must assume the risk of meeting quick-sand, rubbish, railroad-tracks, etc.

Anything omitted in the specifications necessary fully to complete the sewers in workmanlike manner, must be done by the contractor without cost to the city.

SANITARY ADMINISTRATION IN FOREIGN COUNTRIES—SWEDEN.—IV.

BY DR. FREDERICK EKLUND, STOCKHOLM.

For the conservation of health, the most important branch of the hygienic inspection, viz.: the moral shall, in conformity with the valid regulations, be exercised:

A. By the senates of the church and of the schools.

B. By the bodies of the magistrates in the towns.

C. By the communal committees in the country.

D. By the directors for the care of the poor, whose duty it is to give a christian education and instruction to the poor children, of which the direction is induced to take care.

E. By the authorities of policy, if a public arrangement, as for example, show, play, equilibristery, circus, manege, menagerie, jugglery or the like; concert, or to make music, arrange masquerade, ball, fun, game or other pleasures, manifestly aiming at or implying anything that is contrary to morality. In this case the authority of policy has a right to interdict the repetition of the pleasures.

CONCLUSIONS.

In drawing conclusions from this short exposition, in which I have sought to lay bare the principal faults in our present medical administration, I may make the following summary:

1. Among the conditions of competency, to secure an appointment as director-general, or medical counsellor, it was formerly indispensable to be a graduate and doctor of medicine. The third clause of the first paragraph of the instruction to the medical direction, dated November 7, 1877, enacts that as well the director-general as the members shall be duly-authorized physicians, that is, licentiates of medicine. The annoying consequences of this voluntary degradation have already appeared and will probably become more evident from year to year; for example, at the delivering of opinions, and when there are recommendations for advancement and promotion. As a result of this, a member

presidents and the many members of the board of health, and of the communal committees understand almost nothing of sanitary principles; and it is also true that a great many medical men do not possess the necessary qualifications to pursue hygienic investigations, which are the most difficult of all, since they take cognizance in a high degree of the patience, and require extensive and consummate learning, practical skill, much money, and above all philanthropy.

The government of Sweden has a department to design charts relating to the economics; to conduct examinations as to the area of the kingdom, and its varying nature and divisions from an economical point of view, and draw maps of it. We have further the geological investigations, which is intended to communicate knowledge on the general geognostical conditions of the kingdom. Moreover, Sweden has a topographical corps, as a section of the generality, whose duty it is, in time of peace, to prepare and engrave military maps over the kingdom, and also to compile topographical and statistical descriptions; to elaborate ground plats and details of lines for fortifications, military positions and so on. Besides, to secure navigation on the coasts, the larger inland waters, and other navigable waters, gulfs and bays, where a ship may pass, we have a department to draw sea-maps and special charts for the ports. Water draughts and coasts are measured by scientific principles and under the direction of already-existing charts. Sea-maps are designed, and complete hydrographical descriptions are made. But a regular sanitary inspection we fail to have even to-day in hygienical matters; my countrymen have an incomprehensible and much lamentable shyness for the light and are very easily deceived. It might, however, be very interesting indeed to learn more exactly how healthful is the air we breathe, the water we drink and the ground on which we build and dwell, the apartments, even as to the minutest details, that we occupy, the food that we consume, the clothes that we wear, and to study the safety of the travels and visits which bring inhabitants of the kingdom together,—and all this not only generally but particularly for every community, every village, every little farm, every cottage and every dwelling. In this manner we should get a true knowledge concerning the true hygienic conditions of the kingdom even in all their minutest details. Such an investigation is certainly of capital importance.

4. We have seen it is the duty of many different authorities to have superintendence over the morality of their neighbors. It is, however, only on paper that all this exists, for in effect the state of things is quite the opposite. Thus, for example, at the meetings in the churches, the unconverted (and unconvertible) parishioners have, as a rule, a preponderating superiority as to the number. It is now explicit that it lies in the particular interest of all these knaves to elect the church counsellors and church wardens from their own number, and wholly to paralyze the activity of the others. Of course, wilful and notorious sinners, whose visages are branded by the shameful, dishonorable and mean vice of drunkenness, and who manifest contempt for the commandments of the Lord; swearers, breakers of the Sabbath, tobacco slaves, adulterers, gluttons, gamesters, misers and the like are chosen to hold these places of confidence. The consequences are evident. The whole proceeding is only mockery. It is a matter of course that, under these circumstances, the vulgar majority will become highly demoralized, as they have constantly before their eyes, such bad and such scandalous examples for imitation.

IMPROVED CONSTRUCTION OF HIGH BUILDINGS.

Mr. Frederick Baumann, architect, of this city, has prepared a plan for an improved construction of high buildings, which, in view of the present discussion on the subject, demands consideration. The design is to erect on foundations a firm and rigid skeleton, or hull, of iron, and cover it at once with a proper roof. The enclosure, whether of stone, terra cotta, or brick, or any combination of these materials, may be erected at the same time the iron structure is being put in place. But the latter might proceed much faster than the former; while the hull might be roofed within two months, the enclosure might not have proceeded further than the fourth story. Thus there need be no delay to a steady progress. Derricks may be set on the roof for finishing the enclosure in a convenient manner. Large, unwieldy and dangerous derricks may thus be discarded. At the same time that the work on the iron structure is progressing, the partitions, fire places, vaults, arching of ceilings and lining of exterior walls may be put in; thus all interior work would be done and made ready for plastering during the time required for constructing the exterior parts. Mr. Baumann claims that this method would render the work more independent of the weather than by the usual construction; the erection of the iron hull is, in its nature, a rapid process. The practicability of erecting buildings on Chicago soil, twelve and more stories high, then becomes a fact. Light, the great desideratum in all city buildings, is secured, even on the lowest—the most valuable—floors, whereas, otherwise, the necessarily broad piers would be a hindrance. The piers may not only be made narrow, but shallow—twenty-seven inches at the most, thus, again, making a saving of light.

The iron uprights are to be provided with a series of projecting brackets for the purpose of anchoring and supporting the parts forming the exterior enclosure. These supporting brackets will be so arranged as to permit an independent removal of any part of the exterior lining, which may have been damaged by fire or otherwise. The iron-floor girders are securely fastened to the outer posts at both ends. This imparts firmness to the structure; further, it increases the bearing strength of the girders at least to one-half of their usual strength. The iron floor-beams are fastened to the sides of the girders, and will gain thereby at least 20 per cent in strength. Vaults, partitions and fire-places may therefore be placed upon the girders without increase in dimensions, and floor-beams may be made lighter than usual. This, it is claimed, will enable the expert to save in the substance of the necessary iron-work enough to pay for the extra labor of riveting all the parts. A vault, four by five feet internal dimensions, built of porous fire-bricks, with walls nine inches thick without special arching, but having light steel plates in its concrete floor and ceiling, will not weigh to exceed four tons; a fire-place built against a partition, of light, hollow tiles, and with flues specially made of the same material, will not weigh to exceed one ton. Both vault and fire-place may therefore be built at any place and in any story upon a girder without requiring even as much additional strength to iron-girders as is gained by the riveting at both ends. The extra cost of iron posts required in exterior walls will be in an eight-story building, and this will be about an offset, it is claimed, by what is saved in masonry. Buildings more than eight stories high, Mr. Baumann says, would be (circumstances being equal) the cheapest, with the new construction.

Mr. Baumann holds that there will thus be a saving in the four most important items in construction—light, convenience, space and time. He starts out with the premise that there is no exception from the laws of competition. Occupants seek convenience, security and light, all combined with some degree of elegance. The highest success in a happy combination of these will lead to the largest and most permanent rent, when the question is considered from a commercial standpoint. Structures wholly constructed of iron would, in this light, be the most preferable, were it possible to clothe them with proper elegance, and were they proof against neighboring fires.

In Grand Rapids, Michigan, a city with a population of fifty-five thousand, the annual death-rate for January, according to the monthly report of the clerk of the board of health, was only 10.28.

SEWAGE AND SEWER-GASES.

At the recent meeting of the Ohio state sanitary association, held at Columbus, a paper was read by Dr. D. H. Beckwith, of Cleveland, on the subject of sewage and sewer-gases. The substance of it is given below:

It is a common belief among the people that no sewer-gas can enter our houses when the waste-pipes are well trapped. The plumber has examined them and pronounced them quite reliable. The Bowers' trap is attached to every waste-pipe, which makes us feel perfectly secure. Outside of the city limits, the house has the trap, but instead of the waste passing into the sewer, it finds its way to a cesspool located from twenty to one hundred feet from the house. This cesspool is usually covered over very tightly with boards, making it as nearly air-tight as is possible. The occupants of the premises consider the house perfectly safe, as it has the advantage of the best approved sewer-trap in public use. Wells and cisterns are frequently polluted with sewer air caused by a leakage of the drain pipes, or by poisonous matter from other sources. As we drink but a few ounces of water during the twenty-four hours of the day, we are not as liable to be injured by the water we drink as we are by inhaling air that is poisoned by the products of sewage, producing what is known as sewer-gas. During the twenty-four hours, we inhale two thousand gallons of air, which, through the medium of the lungs, is taken directly into the circulation and as a consequence the poisoned germs that exist in sewer-gas carry disease to our system and frequently cause death among the little ones in our homes.

The classification of this paper can be made as follows: (1) Can a sewer trap be so constructed and applied to waste-pipes that it will at all times prevent sewer-gas from entering our homes? (2) Composition of sewage. (3) Analysis of sewer-gas. (4) How to detect sewer-gas in houses. (5) Remedies for the destruction of poisonous germs in sewer-gas. (6) Diseases produced by sewer-gas.

THE FAILINGS OF TRAPS.

Now as to the first: The S trap is used in every drain or sewer, and often becomes untrapped from acting as a true siphon, by running full and thereby producing a vacuum by the induced current of air, which may possibly draw out all the water. The inefficiency of this trap is found in the frequency with which foreign substances, such as fragments of cloth, wool, cotton strings and paper that will not easily become softened, find their way into the trap,—one end hanging out and thus siphoning the trap.

Traps that are not in use become unsealed by the water in them evaporating, and families returning from summer resorts to their homes after months of absence, find their rooms poisoned with sewer-gas, and oftentimes one or more of the family is stricken down with some zymotic disease, within a few days after the house is re-occupied. A few years since, in one of the elegant houses on Euclid avenue, Cleveland, whose occupants claimed to possess the most approved plumbing and drainage, lay a patient in a room in the second story with a carbuncle on his back. The wind and gas forced the trap so that a bubbling noise was heard in the wash-bowl. Upon examination, two to three inches of water were found in the basin in a state of commotion.

The Bower's trap has only been invented a few years. It consists of a rubber ball and socket, and remedies many of the defects of the S trap. I regard it as the best sewer trap in use to-day, and would recommend it for every house that contains drainage pipes. Many persons who have this trap in their stationary wash-stands in their sleeping apartments, as a rule, regard this trap as a perfect safe-guard against sewer-gas impregnating the air of their room, and thus believe that stationary wash-stands can be used in perfect safety. However, when a trap becomes untrapped, it can not be regarded as a safe-guard at all times. The Bower's trap becomes untrapped by evaporation when not in use, and consequently unused rooms are often supplied with plenty of sewer-gas, the presence of which is not known to the occupants. Like the S trap, it can also become siphoned and spread sewer-gas throughout the house. The ball becomes covered with slime and filth when in use, and it therefore is only a partial trap when it is in this condition. The trap should be taken apart and cleaned thoroughly once in two or three weeks. The trap is often located from one to two feet from the upper opening of the waste-pipe in stationary wash-stands, thus leaving a portion of the drain-pipe untrapped, which pipe accumulates filth by its adhering to the inside until a slimy, vegetable lining extends from the inner side of the trap up along the pipe to its opening in the wash-basin. A waste-pipe twelve inches in length attached to a stationary wash-bowl in my office would generate gas if not cleansed every two weeks.

Dr. Dickerson, in his report of sewer-gas, says: The true source of this is to be found in the drain-pipe itself, whose interior surfaces are coated over with ferments deposited there from the fluids and solids which pass through them; and so great is the productive power of these coatings, that less than one-half of a square foot of the interior of a pipe, which never had anything in it except the discharge water from a bath-tub in use about six months, will generate gas to render a house unfit to occupy. Dr. Paine, of Albany, says that typhoid fever was caused where there was a drain only a few inches in length. It is obvious that no traps are proof against sewer-gas. The siphoning out of traps, their partial corrosion, atmospheric conditions, leakage, the absorption of sewer-gas by the fluid sealing them, the accumulation of slime and filth in the house side of the drains, all point to their imperfection. Dr. Thursfield, of England, also reports "tracing an isolated case of diphtheria to temporary exposure and sewer-gas in a house on a short line of sewer, which he knew to be specifically contaminated by diphtheria."

COMPOSITION OF SEWAGE.

Sewage is composed of human excrement and urine from water-closets and privies, kitchen-slops, refuse from wash-rooms polluted with various substances, drainage from stables and slaughter-houses, water and filth from factories, and refuse of all kinds, containing animal, vegetable and mineral substances. The chemical composition of sewage, in places where the modern improvements are introduced into our homes, is, on an average, to one gallon of sewage, 20 grains of organic matter, 6 grains of nitrogen, 1½ grains of phosphoric acid, and 2 grains of potash. In towns where the closet is not used, the organic matter is about one to ten parts less. The average amount of solid matter per gallon is 89.81 grains, of which 27.72 are organic to 62.09 mineral.

There is a difference in the composition of sewage at different times in the course of twenty-four hours, day sewage containing much more organic matter than night sewage. Under the microscope, sewage is found to contain a quantity of dead and decaying matter of an animal nature, and, in addition, multitudes of living substances, bodies and organisms, some of them moving rapidly, while others, like diatoms, move slowly. The bacteria present themselves in wheel-like forms, spirals and various shapes, and are quite rapid in their motions. The microscope also reveals fungi, vorticellæ, conferæ, segments of cellular organisms, and large fungus, seemingly in apparent growth, and other living substances and shapes not yet classified. Sewage, aside from its organic matter and living substances, is composed mostly of water, and this is constantly passing into vapor, as it liberates its one and one-half cubic inches of putrid gases per gallon every sixty minutes.

According to Parkes' calculations for both sexes, the average amount of solid and liquid excreta of all ages is about 2½ ounces avoirdupois of solids and 40 fluid ounces daily for each person. Taking this estimate, one thousand persons would throw off in a year, 25 tons of solid matter and 91,250 gallons of urine. The city of Columbus, with 40,000 people, would pass in a year about 1,000 tons of excreta and 3,650,000 gallons of liquid, while Cleveland, with 200,000 population, would pass in a year about 5,000 tons of solids and 18,250,000 gallons of liquids, which is all to be carried off by sewers and drains.

ANALYSIS OF SEWER-GAS.

The only available analysis known of sewer-gas was that by the Paris sewer department, from the bubbles which come to the surface from the sewer-beds at the bottom of the river Seine, and probably is not unlike that which might be found in the Maumee, Ohio and Sciota rivers, in the vicinity of sewer-outlets. The result is as follows, 100 as the standard: Carbureted hydrogen, 72.88; carbonic acid, 12.30; sulphureted hydrogen, 6.70; carbonic oxide, 2.54; other substances, 5.58, which may be called noxious organic vapors; these are present to a certain degree in all sewers, cesspools, privy-vaults, etc., and what these subtle and dangerous vapors are, chemistry has not yet determined, nor has the microscope as yet been able to detect any organisms. They do not contain carbonic acid nor sulphureted hydrogen, yet they are either oftentimes themselves the cause of disease or are the medium by which the germs of disease are carried from sewers and cesspools in which they float about. It is not the presence of the gases, the composition of which we know, that is most to be dreaded. It is the organic vapors, which are carried in the air, and which are ever active to feed or spread disease.

Gases that are usually found in sewage, and their poisonous effects, are as follows: (1) Carbonic acid gas, or what is more commonly known as marsh gas, or choke damp. This gas has a musty odor, produces suffocation and, when inhaled in large quantities, will produce death. This gas is prevalent in mines, wells and deep sewers. The gradual exhaustion of oxygen and proportionate accumulation of carbonic acid in poorly ventilated rooms, produces disease. Less than 2 per cent. of this gas can not be breathed with impunity. (2) Carbonic oxide is a much more dangerous gas than the one just mentioned. Inhalation of this gas causes headache, nausea, dizziness, drowsiness and great prostration. From 3 to 5 per cent of this gas will destroy life in a few moments. (3) Carbureted hydrogen in frequently found in houses where there is a leak in gas pipes or gas fixtures. It will produce suffocation or death when large quantities of it are inhaled. (4) Ammonia has a pungent odor and will produce irritation to exposed mucous membrane. (5) Sulphate of ammonia has a disagreeable odor, and will produce immediate asphyxia if inhaled in large quantities. (6) Nitrogen gas is not poisonous, is colorless and is devoid of taste and smell. (7) Sulphureted hydrogen possesses an odor similar to that of decayed eggs. It is composed of sulphur and hydrogen, and when inhaled will produce headache, dizziness and vomiting.

Only a few of the symptoms produced by gases on the human system have been mentioned. From all the various examinations and investigations of sewers, it is found that its gases form a varied mixture, and the experiments have furnished us no data respecting the organic constituents, the carbo-ammoniacal vapors, and fetid organic matters, the most subtle and presumably the most dangerous elements of sewer-gas. Among the prominent symptoms are headache, dizziness, tired feeling, pain, soreness all over the body, expecially the lower limbs, loss of appetite, nausea, faintness, chills, slight fever, thirst, restless sleep, loss of energy, eruptions, mental despondency, and difficulty in concentrating thoughts. With these symptoms many persons are affected and continue their daily work for months.

THE TEST FOR GASES.

For sulphate of ammonia, take a weak solution of sulphuric acid, moisten a feather, and if any ammonia is in the sewer-gas, it will discolor the feather. For sulphureted hydrogen, take a piece of clean white paper, make a strong solution of acetate of lead, and moisten the paper. When dry, apply the paper to the place where you expect escape of sewer-gases, and if the gas should be sulphureted hydrogen, black spots will appear on the paper.

Dr. Fergus, of Glasgow, found that ammonia would pass through the water of a trap and bleach litmus paper in about fifteen minutes, and that sulphureted hydrogen and carbonic acid would produce their chemical action in from one to four hours. Agnus Smith says that 8,000 cubic feet of the air of a house into which sewer air had been admitted, discolorized more than twenty times as much potassium-permanganate as the same quantity of pure air.

Another test which I have used during the past three years for detecting some defects in the drain-pipe or trap, whereby sewer-gas could enter our homes, is to pour diluted oil of peppermint into wash-bowls, water-closets and kitchen-sinks, in such quantities that it will find its way to the sewer-pipe or main drain. If any defects exist in the trap or pipes, it can easily be detected by the odor escaping to the air. A house was recently examined by a plumber and re-examined, and pronounced in good condition, and no defects existing in any portion of the waste-pipes. The above test was made, when, to our astonishment, the odor of the oil could be detected in the basement above a concrete floor. On removing some of the concrete, a pipe partially rust-eaten was discovered, where sewer-air was constantly escaping.

METHODS OF DESTROYING SEWER EMANATIONS.

It is a fallacy to depend upon disinfectants to render sewer-gas inert. The reliance people place in their efficacy is fraught with danger. The sanitary commission of Boston says: "Any reliance upon disinfectants, as a means of public sanitation, would be but a delusion and a snare." Many people think that if their rooms are made almost unbearable by some disinfectant, they have accomplished disinfection.

Among the remedies used as disinfectants are carbolic acid, permanganate of potash, ozone, chlorine, bichromate of potash, chloride of zinc, dioxide of sulphur, chloride of lime, charcoal, sulphate of iron, copperas or green vitriol, and chlorate of potash. Chloride of lime is in common use, and in order to do good it must be used in large quantities. As much as 16.33 per cent of pure chlorine has been found necessary to destroy the germs of sewer-air. The odor it produces in a room renders its use objectionable. The most over-rated disinfectant is carbolic acid. It will check ferments, but it will not destroy. It will cause a room to smell so that no other odor can be detected, and will often deceive the physician, who is well aware that sewer-air is in the bedroom of his patient. Its use should be abandoned in sick-rooms, owing to the relative feebleness and uncertainty of its action. Permanganate of potash is free from odor, and when a strong solution is made will destroy gas to some extent. However, the large quantity required and its cost renders it impossible for general use. When used, it requires about two ounces to a gallon of water.

Two years ago a company was organized and placed throughout the city of Cleveland a disinfectant box attached to the water-closet and so constructed that on raising the lid of the closet thirty to sixty drops of thymol would pass down into the waste-pipes. I regard it as a proper way to disinfect, for the fluid would come in contact with the germs that are struggling for life and reproduction, and those that pass by the traps or spring into life from the filth above the trap and there flourish luxuriantly, may be destroyed by the almost constant drippings of the disinfectant. A more reliable remedy for destroying the germs and sewer-emanations is to make a solution of sulphate of iron. This solution will not only arrest decomposition, but will absorb the odor of sulphureted hydrogen, which gives the vile odor to sewage air, absorbs ammonia and oxidizes organic matter with which it comes in contact. It is largely used in France and England in solutions for disinfecting closets, fæcal matter from animals in slaughter houses, ditches, sewers and drains, and all places where noxious vapors are produced. The cost of sulphate of iron is only two or three cents per pound. Its cheapness is a great consideration to the mass of the people. One and one-half pounds to a gallon of water is capable of making the surface of waste-pipes unfit for vegetable growth or life, and if applied once in twenty four hours to all closets, wastes and drains, will no doubt destroy the germs which are striving to exist in our homes There is one disadvantage to its general use. If the solution comes in contact with marble basins or slabs, it will stain them so that the coloring can not easily be removed. It should be introduced into the water-pipes through a funnel, which remedies the above objection.

Charcoal has been highly recommended, and it is said to possess the power not only of absorbing sulphureted hydrogen and ammonia, but also of destroying the gases thus absorbed. It requires special contrivances for its use, which renders it unfit for general use.

The Ionia (Mich.) board of public works have established water-rates, in which the charge for supplying buildings in process of construction is five cents for each thousand brick laid; two cents for each perch of stone; twenty cents for each one hundred yards of two-coat plaster, and thirty-six cents for three-coat.

THE PLUMBER IN HIS RELATIONS TO SANITARY PROGRESS, AS VIEWED FROM THE COLLEGE OF PRACTICE.

The first meeting of the Ohio state sanitary association at Columbus, on Feb. 14 and 15, was attended, among others, by representatives of the master plumbers' association of Cincinnati. In behalf of the master plumbers of the state a paper was read by Mr. James Allison, a master plumber of Cincinnati, on the subject given above. Mr. Allison referred to the intimate relation which existed between the medical profession, architects, builders, and plumbers, but added that, while the first three named had always existed, the last were essentially a creation of civilization. The savage has no need of plumbers or sanitary engineers; the forest is his water-closet, and the rivers his bathing-places. His successor, the agriculturalist, who settles in permanent habitations, is content with a high stump, or earth-closet; fills a trench with gravel for drainage, needs no sewer, and digs a well or cleans out a spring for water. But so soon as man begins to concentrate in towns and cities, he is confronted with a series of natural laws which compel him to devise some means, not only of getting rid of the offal and waste, but also of securing sufficient supplies of proper water and air.

"History has not been able," Mr. Allison continued, "to point out when man commenced this work of providing against disease and discomfort, for the most ancient people who erected cities, were more munificent and thorough than we in their arrangements for water, sewage and drainage. In Pompeii were found water-closets of marble, elaborately carved, and constructed on correct principles for convenience and efficiency. These things were the results of an imperious necessity, in order to preserve the health of man in large communities. They were called sanitary, and meantime the improvements in machinery for manufacturing lead into pipes and sheets had brought that metal into general use, and the workers came to be called plumbers (from the Latin word plumbum, lead). Of course you knew all this before,—I only ask you to remember it. As the world advanced in industrial arts, and cities increased in population, it is easy to see that the responsibilities of the plumber would also multiply, and if he was as faithful to his trust as other artisans are expected to be, we should find him keeping in the front rank of sanitary progress. I need not ask you if our anticipations have been realized in this particular. It has been no easy task for him to apply correctly the principles of sanitary science, and at the same time meet the views of a parsimonious builder, or the caprices of owners whose fancies not infrequently are inimical to a safe system of drainage, although, in any event, they never fail to hold the plumber responsible.

"Another point I would like to call your attention to is the proper ventilation of our homes. The big back log in an open fire-place of a log-cabin, left but few problems of this kind unanswered; but with the water service of to-day and its attendant closets, sinks, soil-pipes, traps, sewerage and drainage, came also steam, furnace, and stove heating, involving new necessities for ventilation; and the plumber in his ascent in the rugged path of evolution found himself confronted with another obstacle, about which he knew as little as he had once known of water and air, all of which the intelligent plumber of to-day is supposed to know, and be able to provide against. Nothing is more calculated to elicit the admiration of a curious world than the alacrity of the public to hold him responsible and the Christian humility with which he bears his burden."

Mr. Allison here referred to the inefficient sanitary regulations in Cincinnati, and urged a practical reform through state legislation. It had been proposed, he said, to prepare a law similar to the laws in force in other large cities throughout the country, and all professions represented at the convention were asked to coöperate in securing its passage. He continued: "Shall we, to whom the people look for knowledge, ability and honest dealing, be found arrayed on the side of the evils, or against them; and when the public discover that our integrity has been weighed against a few dollars discreditably earned, and found wanting, what will the verdict be? My views upon this subject are well-known; they are to render ourselves masters of sanitary science, and then make our work correspond to its highest requirements. It is a public, as well as our own, misfortune, that cheap people, proprietors, builders and plumbers, have been able to perpetuate the evils of ignorance and faithlessness. The road of reform has been and will be a hard one to travel; but with your united efforts (which we look upon as a special dispensation of Providence) in behalf of a long-poisoned and much-abused public, and our equally-abused craft, we have strong hope of success. Where can such a trinity be found whose common object is the public welfare,—without grounds for personal jealousies, and whose professional interests do not clash—architects, doctors and plumbers, whose motto can be, "all for each and each for all," a happy combination of the classic and mechanic arts, under the leadership of science. To the architect and builder we look for the plans and specifications whereby science shall be wisely and tastefully applied to the convenience, use and health of man; but in order to secure these we are compelled to refer to medical science for the accumulated experience which enable us to select healthful locations, and provide the necessary sewerage and drainage, and obtain the proper ventilation and pure air required. It is only by the aid and counsel of the doctors and builders that the sanitary plumber is able to accomplish his part of the duty. "As unto the bow the cord is useless, each without the other," so the architect and builder are to the plumber and to the doctor; each takes from each to make the artist, who applies with skill the science he acquires from the other.

I cannot too often nor too clearly express my feeling of satisfaction that ministers of science and art, at the threshold of whose temple we have worshiped, are awakened to the evils by which we are beset, and are in arms to provide remedies. In the cities of the old world this question has been fairly settled, and sanitary work in cities, covering the water and food supplies, the correct ventilation and plumbing of houses, supervision of tenement-houses and workshops, and proper police regulations in regard to sanitary matters, have reduced the sickness and death rates (of the larger cities) over 30 per cent. For example, the death rate of London maintained its average for thirty years up to 1870, while since the enforcement of sanitary regulations during the ten years to 1880, 76,000 children of school age have been saved over the previous death rate. Such is the experience everywhere, and it is not necessary to repeat the catalogue of diseases against which sanitary laws must be provided and against which all the science and philanthropy in the world are powerless, without laws and the power to enforce them. The question is no longer as to the existence or nature of the evils but the remedy, and the best methods of applying it. New York and Brooklyn and other eastern cities are fully aroused and have already taken steps in the right direction, and already the beneficial effects of laws to compel correct sanitary regulations are showing themselves in the increasing activity of health boards, the better construction of houses, and, above all, in the dignity and comprehensiveness of the plumbing trade, which is taking its place among the arts and will in time be ranked among the professions.

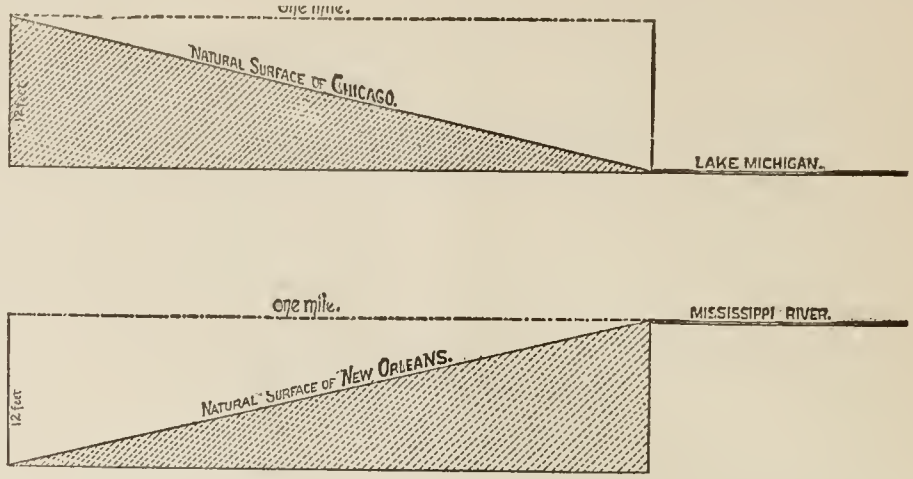
"It is surprising how soon one will learn to build correctly, when the arm of the law is stretched out over him. Let the law prescribe what shall and what shall not be done, with sufficient penalty for violations, and the education of plumbers and builders will be easy. We have no hesitation in making laws to govern the apothecary, upon the ground that he is dealing with affairs of life and death, or designating who shall administer medicine for the same reason; yet the yearly mortality arising from the criminal neglect, or ignorance, of the simplest laws of health on the part of those upon whom the responsibility rests, outnumbers the others ten to one. I invoke the power of the law as a teacher and monitor of the people and those who do their work; let us act openly and boldly; let the opposition come as it may, we have nothing to fear. We cannot lose, and have everything to hope. Let us at once select a joint committee with instructions to prepare a proper memorial and bill to the Ohio legisiature which after due approval by our joint or respective bodies, shall be properly presented by an authorized commission to the legislature, and pushed through at the earliest moment. It is not difficult to frame a law, with the experience of other cities as our guide. Whether such a law should include provision for the enforced education of plumbers in several grades may be now questioned as premature, but it must come to this some time. I believe with Hellyer, the best practical authority we have on English sanitation, that sanitary science, notwithstanding the earnest endeavors of its medical and architectural experts, will be shorn of half its strength until the class that perform the mechanical work is instructed in the reasons for what they do. Hellyer says there are a 'thousand gates to death' and 'few are wider or open more readily than those in our own homes when unlocked by noxious gases from foul drains.' Who can number the deaths or estimate the diseases caused by polluted water tanks, brick cesspools, diseased water-closet traps, a bottled-up soil-pipe, or bell trap? Death is not dealt boldly and openly by soil-pipe air; it never warns you like gas, but steals in after a cowardly fashion and kills slowly an inch at a time. These are some of the reasons why knowledge should be not altogether confined to sanitary and medical experts; in the system I would approve there should be a line of promotion so provided that the grimy helper of to-day could become a master-plumber and sanitary-expert of the future. But let us first secure a code of wholesome sanitary laws and begin the work."

DRAINAGE OF NEW ORLEANS.

The question of drainage as applied to New Orleans is one that has long perplexed some of the ablest local civil engineers. In fact, there is no rational system in vogue at the present time. One would suppose that the mighty Mississippi river, flowing through the limits of the municipality, might easily be made to serve as a vehicle for conveying sewage and storm water away from the city. When the topography of the locality is taken into consideration, it is clear to observers that the river cannot receive the sewage without costly pumping machinery expensively maintained, for when full, the river is higher than the city, and is kept in its course by embankments called levees. The ground surface of the city declines from the river, being, in the matter of grade, the exact reverse of what is observed at Chicago. The surface of the great western city inclines towards lake Michigan twelve feet in one mile,* while the surface of New Orleans has a declination from the river of twelve feet in one mile. From this it appears that the latter city has certain difficulties to meet in dealing with the drainage problem, the like of which are not to be encountered at Chicago. The following diagrams showing profile views of the relative grades of the two cities, taken from surveys made by Mr. H. C. Brown, make sufficiently clear the chief obstacle that lies in the way of providing New Orleans with an adequate drainage system.

There is no public underground drainage or sewerage system in the

*This statement is not strictly correct, though near enough for a general comparison. The elevation above the lake three miles west is only seventeen feet, though the average elevation of the city is about twelve feet.—Ed.



Crescent city, because water is everywhere found from two to four feet below the surface, which peculiarity of the soil would make such a system enormously expensive, and, beside, there is no outlet having sufficient fall to ensure a natural flow of any liquid. The drainage is effected through street gutters, primarily, into ditches, apparently from six to twelve feet deep and perhaps averaging from twenty to twenty-five feet in width, and these in turn empty into larger drainage canals that extend back from the occupied part of the city to lake Pontchartrain. There is a wide swamp intervening between the river and lake; and the two bodies of water are about seven miles apart. Including bayou St. John there are six passages for water; and the new canal like the bayou is navigable for small water craft and light-draft steamboats. Back of the city, the surface of the ground being nearer a true level, the water in the drainage canals proper does not naturally flow actively and therefore drainage wheels have been erected at several points. These wheels resemble those of stern-wheel steamboats, so common on the Mississippi; they are placed athwart the canals, and are driven by steam to push the sluggish water out in the direction of the lake. These drainage wheels, when not out of repair, are effective means of reducing the immense bodies of storm-water that settle in depressed portions of the city after a profuse downpour of rain, especially during the rainy season. Although the drainage wheels, in ordinary times, perform the service of pushing along the superabundance of water, there are occasions when they are unable to cope with the difficulties that arise from storm-water backing in from the lake upon the rear of the city. Strange as it may appear, there has never been a suitable protection levee built along the shore of the lake, and there is no system of locks, or flood-gates, to guard against the influx of water from the lake that may be precipitated upon the low-lying rear portion of the city by a long continued northerly storm. It sometimes happens that the streets and sidewalks in the business portion of the city are under water hours at a time, and in depressed areas the water often remains for days at a time because of violent rain storms.

In olden times, the present city territory was divided into a number of municipalities, and each had its mayor and council and civil machinery, and to all intents and purposes was a city by itself. The different schemes of drainage attempted to be worked out by numerous engineers at various times and in diverse parts of the city, have produced a confused state of affairs, that must be remedied sooner or later by a sanitary engineer of more than ordinary ability. This matter is now pressing upon the attention of citizens to a greater degree than ever before. The city council has, within a few months, voted to offer to give $500 to the person resident here, or elsewhere, who, within reasonable time, presents to the council a plan of the best system of drainage suitable to New Orleans. One circumstance will doubtless prove vexatious in the proposed undertaking. If, at any time, profile charts of the city have existed, they have long since disappeared from the city surveyor's office, so that, hereafter, the work, if properly done, will have to be begun de novo.

But this subject is not fairly treated without a few words touching the subject of house-drainage. The houses, as a rule, of course, have yards, and there is commonly in each case a passage-way leading thereto. From some convenient point in each yard runs an open drain, from six to twelve inches in width and depth, along the passage across the sidewalk to the street gutter. Thousands of these narrow drains, constructed of wood, brick, stone, or iron, intersecting the sidewalks, are open at the top, while wider ones are closed by plank, stone or iron covers, with narrow openings to admit of the periodical dislodgment of filth. Into these drains are thrown the slops from chamber and kitchen, and, in some neighborhoods, more objectionable matter. All orderly families require the servants to keep the drains clean by a free use of hydrant water, but there are others, poverty-stricken and negligent, who would live and die surrounded by filth and evil odors, but for officers connected with the New Orleans auxiliary sanitary association. This association is managed by a small body of citizens, headed by Mr. Edward Fenner, which gives its services free; and the necessary expenses are borne by the subscriptions of merchants and others interested in the welfare of the city. This association made 72,922 inspections of premises, and abated 12,677 nuisances last year.

The privy characteristic of the New Orleans dwelling is a primitive affair; it may be approached by a covered gallery on a level with the second story, but in all cases there must be a vault in the ground. The water-closet, so commonly in use in houses located in northern cities, is but rarely introduced here. There is a prejudice against introducing

such an appliance into a southern home; and as there are no means of conveying sewage away by underground pipes, as is the case in other cities, it stands to reason that the water (first to be purchased of the water-works company) used for flushing, must run into a vault on the premises, to be expensively removed as night-soil. In the scheme of house-drainage here there is never any connection between the privy-vault and the street-gutter permitted by the vigilant sanitary inspectors. Abuses of public health and sanitary laws of this nature have at times heretofore existed, but such violations are now rarely recorded. Rain-water caught from the roofs of houses and stored in cisterns above ground, is chiefly used for drinking purposes; but there are families that say they like to drink and use the muddy water of the Mississippi, pumped up by the water-works company and supplied to consumers through iron pipes. Be the supply of water for flushing the yard drain large or small, matters are mended when the refuse water reaches the street-gutter, for there it meets a large and strong current of river water that has been raised by the pumps of the sanitary association and distributed to the gutters of streets extending at right angles with the river. The lateral street-gutters, as one may guess, do not receive a due proportion of the water so freely supplied by the sanitary association; but it is highly probable that the deficiency will, ere long, be remedied by an automatic or other device.

There is one observation bearing upon the present state of drainage that ought to be made here. However abundant and sufficiently-purifying the flow of water in the street-gutters may appear to be, the current no sooner enters the choked, unlined drainage ditches (by courtesy called canals) than it becomes foul and sickening. The sanitary association has already made a number of valuable suggestions in relation to improving the drainage of the city, and has done much, by erecting and operating flushing-pumps, to purify the foul gutters. To recount the beneficial labors in the cause of public health of this volunteer organization, would require more time and space than can be given to the matter here and now. Such, in brief, is an outline of the general features of the drainage methods now made use of in this city. J. T. PAYNE, M. D.

IT is often true that people who have moved into new houses prepared for them entirely by the builder, decorator and upholsterer, and in whose arrangement they have had no voice farther than the general direction that everything shall be in the newest and most approved fashion, feel a sense of strangeness and discomfort with their new surroundings, which they attribute to the shortcomings and mistakes of the workers who have had the house and its furnishings in charge. They "don't like the new house," and often feel a genuine homesickness for the less pretentious and familiar old dwelling. In a dwelling place which is to fulfill the requirements of a home, a mere investment of money is not enough to insure possession. The care, the planning, even the sacrifices which personal thought and arrangement make necessary, alone bring the sense of intimate knowledge and companionship which give to one's home surroundings a restful and helpful personality. There is a moral influence in these things which has been too little considered, and when those who make the home realize that even in the selecting of furniture and fabrics, and the ordering of their rooms, there is a moral responsibility, we shall be far on the way toward a sweet, healthy and honest mode of living. It is a hopeful sign that fashion is bringing solid and genuine shapes and fabrics into favor, and, even the popularity of old designs in all the departments of the household, argues well for the permanency of the home where they are thoughtfully introduced. The days of veneer and varnish grew to be the days of superficial living, elastic honesty, and an easy inclination to substitute the hotel and boarding-house for the home. In one's household belongings, association is the only real possession, and the popular tendency toward the substantial forms of a sturdy earlier time, craze though it may be at present, may hold a promise for sturdier manners and morals, which will be worth the world's realization

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A WRITER in a recent number of a popular English magazine objects strongly to the fashion which prevails at present among persons who proclaim themselves art admirers and connoisseurs of "filling their dwellings with bric-a-brac and all kinds of rococo productions." He says: "There may be puerile Chinese and Japanese productions in profusion, exhibiting here and there a trace of true art instinct, but oftener you shall find those *objets d'art* nothing but the realizations of the hideous night-mares of the awakening intellect of semi-barbarous peoples. The man of judgment knows full well that the foundations of true taste inhere in simplicity, in order, in proportion,—in short, in moderation. The furniture and hangings in the house of taste will be simple. They will not be overlaid, bedizened with excess of color and of ornament, as is so much the fashion in Europe. The man of taste likes to feel that he has elbow-room and space to breathe freely in his dwelling apartments; he does not desire to be in danger, if he move, of breaking some insignificant cup and saucer, whose only claims to respect are that they have been purchased at some fabulous price, and that they were baked in the ovens of some famous old pottery."

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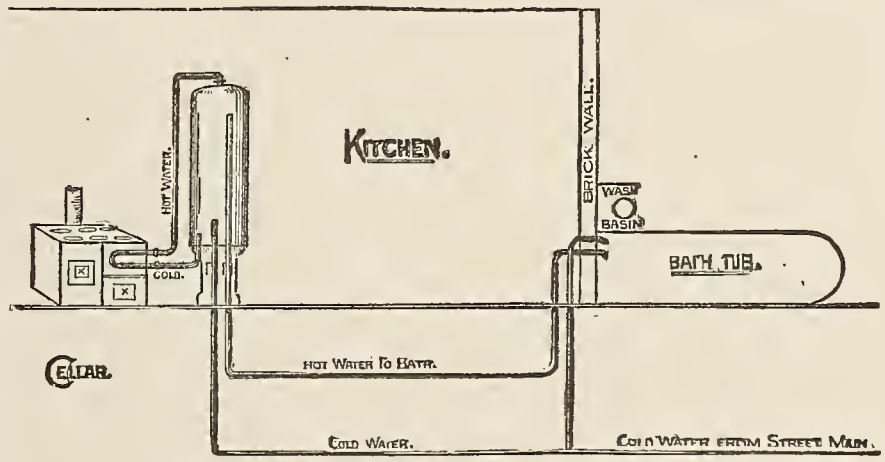
WHAT to do with the refuse matter which is daily thrown into the alleys of this great city is a problem which has not yet been satisfactorily solved, and the carelessness of housewives and the stupidity of servants make the matter still more complicated. In households of ordinary size all refuse matter from the kitchen should be burned at once, and, if proper care is taken, this can be done without any disagreeable odor. The approaching summer and the uncertainty of the scavenger's visits, make this a subject which should receive the most careful attention of the housewife. The unsightly heaps of decaying matter which accumulate so rapidly, through wastefulness and inattention in the kitchen, are responsible for much of the sickness which every year proves fatal to the little ones and the weak ones among us. In this matter of absolute cleanliness there should be no choice. It is a necessity, too urgent and imperative to be disregarded in the smallest particular.

MARTHA HOWE-DAVIDSON.

DEFECT IN HOT WATER SUPPLY.

FREEPORT, ILL., February 15, 1884.—(To The Editor).—As a subscriber to your paper I take the liberty of making a few inquiries. I have a hot-water boiler connected with a range in my kitchen and carry the water to a bath-tub and wash-bowl in another room. As now arranged, if I wish to get hot water in the bath-room I must first draw off quite a quantity of cold water, which is in the pipes, before the hot water comes. I enclose diagram of pipes as now arranged, and would like your advice or opinion as to how the change could be made (without a complete change in the pipes), so that upon opening the faucet the hot water will flow without first drawing off the cold water as stated above. I should have stated probably that the kitchen has a cellar under it; but the bath-room, built some years afterward, has no cellar or space under it. This is why we bring the pipes up from under the kitchen-floor into the kitchen and then through the brick wall which separates the kitchen from the bath-room. There is no opening or door from the kitchen into the bath-room, the bath-room being entered from another room. Could there be a circulation had by tapping the hot water pipe (as now arranged) at the point where it comes up through the floor just before it passes through the wall into the bath-room and carrying a pipe along the ceiling back to the boiler on top? I do not care if some pipes are in sight in the kitchen. Respectfully yours, A SUBSCRIBER.



The best thing to do would be to substitute a new boiler, by the construction of which the hot water could be taken out through the top, since the cold water in the lower part of the boiler always tends to cool the hot water as it is being drawn off. The greatest trouble in the present instance, lies in carrying the hot water pipe down through the floor and through the cellar. It would be impossible to keep the water hot in this pipe, even granting that it could be heated. But it will always be impossible to heat the water in this pipe as now placed, and it is only to supply the vacuum created by drawing off the cold water in the pipe that hot water can be led into it at all. It would not mend matters much to have the hot water pipe run along the floor of the kitchen to the bath, as the bend would still form a sort of trap, which would always be filled with cold water. It would help the matter to put in a pipe, as suggested by the correspondent, extending from the inlet to the bath up over the ceiling to the top of the tank, and thus secure a circulation, but still better, and properly, he should use such a pipe as he suggests in place of the one under the floor. Let him close up the present outlet to the boiler, remove the pipe, if he wishes, connect it to the boiler at the hot-water inlet at the top, and carry it along the ceiling, or wall, to the opposite side of the room and then downward to the bath. He will then find the water at least warm when he turns the bath faucet, and soon hot, if his fire is warm enough. The hot water outlet at the top of the boiler may be the main pipe, and the hot-water pipe from the stove branch into it, near the boiler of course. The hot water from the tank will be drawn off first.—ED.

The total of building operations in 1883 in New York city will foot up forty-five million dollars.

THE HOTEL BUCHTEL.

Cincinnati, O., March 6, 1884.—(To the Editor).—In your issue of the 1st inst., you have an article headed "Some Features of a New Hotel," and give a general description of the Hotel Buchtel of Akron, and state that the steam-work was done by John Robb. We should be pleased to have you correct the assertion, as we fitted up the entire building with our improved steam heating apparatus, and also the Arcade Building at Akron. These two jobs of steam heating are the finest in the state, and both buildings are heated with less than one pound pressure on the apparatus. Please make the correction, as we do not like to have a party that had nothing whatever to do with this elegant job of steam work, get credit through your columns for doing it. Yours truly,

The Cincinnati Steam Heating Co.

BUFFALO NOTES.

Buffalo, N. Y., March 6, 1884.—(Special).—The city engineer has received the following bids: For dredging the Buffalo river, from the west end of the north pier to a point four hundred feet southerly from Aurora street, from Hingston & Woods, 21 cents per cubic yard, dumped below the Pulet pier; or 11 cents per cubic yard, dumped one mile west of the lighthouse. The same bids have been received for dredging the Buffalo river, outside the north pier, Blackwell canal, from Buffalo river to the south termination of the canal, and for dredging Peck slip from Buffalo river to the Blackwell canal.

A trunk sewer is being constructed at a cost of $1,000,000, George E. Waring, Jr., engineer.

Recently, the sanitary condition of school No. 18 was complained of by the superintendent of education. The rooms were all made foul by an unbearable odor. The school committee of the city council, the city physician and the district physician made an examination and found that the main steam pipe passed through the water-closet. This set up an air current from the water-closet, and practically ventilated it into the school-rooms. The defect will be promptly remedied. J. S,

CURRENT PUBLICATIONS.

PREVENTIVE MEDICINE—RICHARDSON.

The name of Dr. Benjamin Ward Richardson has always been associated with the most advanced ideas in sanitary science. Indeed, by some conservative sanitarians, it has been thought that he was ahead of the times too far. His foresight has in no instance been more creditably shown than in the production of a book of practice of preventive medicine. For fear the term would be misunderstood by being associated with the word medicine, the author has, in his short preface, stated that the book was written for the members of the intelligent reading public, who, without being medical, might desire to know the causes and prevention of disease. In presenting this book, the author studies the nature of the disease, the cause of its prevalence, and then its prevention. The author has taken a large portion of the book to define and state the causes of 1,146 diseases which affect mankind. These diseases are taken up and described after the classification of the royal college of physicians and surgeons. A "practical summary of the origins, causes, and preventions of disease," is then given, in which the author states concisely what conditions should be avoided to prevent certain diseases. In the prevention of zymotic diseases, he pays particular attention to the removal of house refuse, and recommends glass for the soil-pipe. The book, while written for the British islands is applicable to the diseases on this side of the ocean, and will probably attain a wide circulation. Henry C. Lea's Son and Co., of Philadelphia, are the publishers of the American edition, which is sold in cloth at $4.00, in leather at $5.00, and in half Russia at $5.50. It has a copious index, which makes reference to the 713 pages easy.

BRYAN'S DIRECTORY OF THE BUILDING TRADES.

This annual publication for 1884 is very attractive in appearance, and is probably as correct a list as can be made of the architects and builders and carpenters. There are names and addresses in the book of 2,475 architects, and of builders carpenters and contractors, 45,019. It is published by Clark W. Bryan & Co., Holyoke, Mass., at $2.00.

WOOD'S MEDICAL LIBRARY.

This standard series of publications, now so much appreciated by the profession, has for the January volume the third volume of Legal Medicine, by Charles Meymott Tidy, M. B., F. C. S. The legal phases of legitimacy and paternity, pregnancy, abortion, etc., infanticide, asphyxia, drowning, hanging, strangulation and suffocation are treated. The issue for February is on the pathology and treatment of gonorrhœa, by J. L. Milton, being the fifth edition. These books may be obtained of W. T. Keener, 96 Washington street, Chicago.

PUBLICATIONS RECEIVED.

PREVENTIVE MEDICINE. By Benjamin Ward Richardson, M. D., LL. D., F. R. S., Fellow of the Royal College of Physicians, and Honorary Physician to the Royal Literary Fund. Pp. 737. Price, $4.00. Philadelphia: Henry C. Lea's Son & Co. 1884.

PATHOLOGY AND TREATMENT OF GONORRHŒA. By J. L. Milton, Senior Surgeon to St. Julian's Hospital for Diseases of the Skin, London. Fifth Edition. Pp. 306. New York: William Wood & Company, 56 and 58 Lafayette Place. 1884. Chicago: W. T. Keener, 96 Washington st.

LEGAL MEDICINE. By Charles Meymott Tidy, M. B., F. C. S., Master of Surgery; Professor of Chemistry and Forensic Medicine at the London Hospital, etc., etc. Vol. III. Pp. 321. New York: William Wood & Company, 56 and 58 Lafayette Place. 1884. Chicago: W. T. Keener, 96 Washington st.

BRYAN'S DIRECTORY OF THE BUILDING TRADES. A Complete List of Architects, Builders and Carpenters in the United States. Issued Annually. 1884. Pp. 568. Price, $2.00. Holyoke, Mass.: Clark W. Bryan & Co., Publishers.

THE AIR WE BREATHE AND VENTILATION. By Henry A. Mott, Jr., Ph. D., E. M., F. C. S., etc. Mott Series, No. 2. Pp. 80. Price, $1.00. New York: John Wiley & Sons, 15 Astor Place. 1883. Chicago: S. A. Maxwell & Co., 134 and 136 Wabash ave.

THE MILK SUPPLY OF COLUMBUS. By Prof. Curtis C. Howard. Paper read before the Ohio State Sanitary Association, Feb. 15, 1884.

CIRCULAR. From the California State Board of Health to the Boards of Trustees and Local Boards of Health of Incorporated Cities and Towns, with Extracts from the Political Code. F. W. Hatch, Secretary

NITROUS OXIDE AND AIR. Its Application to Produce Anæsthesia in Persons for Dental and Surgical Operations. Paper read by Dr. E. P. Howland, of Washingington, D. C., before the American Association for the Advancement of Science, at Minneapolis, August 20, 1883. Pam., pp. 13. Minneapolis: Johnson, Smith & Harrison. 1883.

INTERNATIONAL HEALTH EXHIBITION. London, 1884. Objects, Regulations, Classification, Memoranda, etc. Pam., pp. 40. London: William Clowes & Sons, 13 Charing Cross, S. W. 1884. Secretary, E. Cunliffe-Owen, Esq., B. A.

JOHN HOPKINS UNIVERSITY CIRCULARS. Baltimore: John Murphy & Co, 182 W. Baltimore st.

NEW JERSEY MILK ADULTERATION ACT, and the Results of Its Enforcement. By William K. Newton, Paterson, N. J., February, 1884. Pam., pp. 15.

RELATIONS OF THE SOIL TO HEALTH. By George H. Rohe, M. D., etc. From the Third Annual Report of the State Board of Health of West Virginia. Pam., pp. 8.

THE PROBLEM OF MEDICINE AS A PROFESSION AND A PRACTICAL ART TO-DAY. By Charles N. Hewitt, A. M., M. D., etc. President's Address at the Annual Meeting of the Minnesota State Medical Society, June 6, 1882. Pam., pp. 24.

CIRCULARS on Diphtheria, Small-Pox and Typhoid Fever, State laws, and other documents from the Minnesota State Board of Health. C. N Hewitt, M. D., Secretary, Red Wing.

INFLUENCE OF FLOODS UPON HEALTH. Circular Issued by Kentucky State Board of Health. J. N. McCormack, M. D., Secretary, Bowling Green.

SANITARY ASSOCIATION NEWS.

MASTER PLUMBERS' ASSOCIATIONS.

At Chicago, March 5.—The regular semi-monthly meeting of the Chicago master plumbers' association was held on the evening of March 5. After the transaction of regular business, the sanitary committee, in its report, called the attention of the association and the public to buildings that were erected previous to the passage and enforcement of the present health and building ordinances. The committee thought it safe to say that sewerage of such buildings is faulty, no provision having been made at the time of their erection for their proper ventilation. The present laws governing the health department allow it to take cognizance of such cases upon complaint only. This was a matter in which the press and the public could be of great benefit in helping to lead public opinion so as to compel owners of such property to put their buildings in good sanitary condition.

Resolutions of respect on the death of Mr. Charles Brier, a deceased plumber of this city, were adopted.

The committee on state organization reported that they were busily at work. Circulars were being sent to all parts of the state, and encouraging replies had been received. Mr. Griffith, the chairman of the committee, thought that there would not be a town in the state not represented at the coming national convention, which will be held in June next. Mr. Murray reported that many portraits of deceased plumbers had already been promised, and that it was likely the walls of the new library would soon receive them. President Young stated that permanent rooms for the association had been secured at No. 125 Dearborn street. Mr. Hamblin reported for the committee on entertainment.

Mr. Murray read a letter from Abraham Mead, of New York, in which the writer congratulated the Chicago association on its progress, and spoke encouragingly of their prospects of organizing throughout the country. Mr. Murray stated that he found a check for $50 enclosed in the letter to be applied to the purchase of books for the library. Mr. Mead was warmly thanked by the association for his gift; a letter was also read from Mr. W. H. Graham, president of the master plumbers' association of St. Louis, in which he gave an account of the recent entertainment of the association of that city. He also stated that he was the recipient of a silver service from the association, the presentation of which was made by Mr. D. J. Collins in a proper address. A communication from J. Henry Howe, of Rochester, N. Y., was read. Mr. Howe wanted a copy of the constitution of the master plumbers' association of Chicago, and other information that would assist the plumbers in Rochester in organizing; a letter was read also from Philip H. Murphy, who gave a detailed account of the organization and work of the association in Milwaukee. Out of twenty shops in the city, fourteen were represented in the association.

Mr. A. W. Murray read a paper which he had prepared on the importance of securing and maintaining a library. He stated that plumbers in the past had felt the want of good works on plumbing and kindred subjects—sewerage, gas and steam-fitting,—and their labor to be at a disadvantage on that account. It therefore became the duty of every plumber to do what he could himself, and invoke the aid of others, toward remedying this state of affairs, until exhibition rooms and libraries were established in every state. By libraries, exhibition rooms and laboratories they could aid not only the master in solving many of the intricate problems in the trade, but the apprentice and journeyman as well. The mechanical arts dependent on plumbing would be benefited by a thorough education of the plumber; if the intelligent explanation of a suggested improvement is given to the consumer he is led to adopt it; hence the lead manufacturer, trap and iron founder are much benefited; the public at large are benefited; standard of work would be raised, and the plumber no longer be blamed for sickness and death by reason of defective drainage.

A paper of considerable practical importance was read by Mr. J. J. Wade. The first part of it was retrospective in character, the rapid and stable progress which the Chicago association had made since its organization being dwelt upon at considerable length. This led to a discussion of the possibilities which lay before the association, and the point to which the writer called particular attention was the desirability of

the association's constructing a building of its own. Mr. Wade thought this was entirely within the range of possibilities, and he saw nothing in the way of proceeding at once to carry out the project. He outlined a plan, which was, in substance, that a site could be purchased which would cost about $15,000. The money for this could be raised in one year, and, during the second year, another $15,000 to erect a building. He would have shares issued by the incorporated association at $10 each, and he was satisfied that 150 members would take ten shares each the first year. The money for the building could be secured the second year in the same way. Once erected, it was safe to say that $4,000 in rents could be realized annually, the expense in maintaining the building not exceeding $1,000. Besides the profit, the association would have its own assembly rooms, library, show-rooms, laboratory, etc. He thought it possible that the third annual meeting of the association might be held in rooms of its own. With its own building, the association would command new interest and respect from the general public. The association would also be in a better position to teach apprentices, who should learn something of the science of plumbing; there would then be some incentive to become a plumber in the true sense of the term, and not, as now a mere solderer of pipes. Mr. Wade's paper was well received, and his suggestions will no doubt be acted upon soon and favorably.

On motion of Mr. Murray, a committee of three, consisting of Messrs. Murray, Bowden and Watt, were appointed to prepare a report-book for workmen, in which there should be also practical notes for their benefit. It is intended that this shall be a book for the record of time and work.

Mr. George Cummings, a plumber of Brooklyn, was present and was introduced to the association. Mr. Cummings referred to the pleasure which he had in meeting the Chicago plumbers, and said that he heartily agreed with what they were doing here. The work of organization was daily becoming easier throughout the country, although it was a task yet to get men in the east to realize the benefits of organization. Associations were being formed so rapidly that he thought there would be from sixty to seventy-five associations represented at the coming convention in Baltimore, — more than had been expected last year. He paid the highest tribute to Mr. Mead for his service in this line. The executive committee was making slow progress as a committee, and the officers of the national convention were not doing much, for the reason, principally, of the great pressure on business. Mr. Cummings was exceedingly well pleased to see the interest taken in the library. He suggested to the association that the plumbers write their own books, and not wait for some one who knew nothing about plumbing to do it. They would then have practical books. He thought it an excellent idea to establish schools for plumbing, as had been done in Philadelphia. He looked upon a plumber as a man who is guided by habit largely, like other men, and had noticed that the master plumber was very apt to do what he had done as an apprentice. The boys should be started right in their work and they would continue to do it well afterwards.

On motion of Mr. Murray, all money received on account of the library was hereafter to be applied to the library fund.

The following new members were elected: M. J. Condon, Thomas O'Malley, P. L. O'Hara, of Hyde Park, Mr. Galloway, of Ravenswood, John E. McDonald, J. B. Olsen, John Mathews, of Mathews & Holt, and Rupert Coleman.

At Cleveland, March 3.—The master plumbers' association met in regular session and adopted by-laws closely resembling those of the Chicago association. The proposed constitution for the national master plumbers' association was read and approved. The following was voted to be submitted to the board of health:

TO THE HONORABLE BOARD OF HEALTH OF CLEVELAND, O.,—*Gentlemen:*—At a regular meeting of the master plumbers' association, held March 3, the following preamble and resolutions were adopted:

WHEREAS, The health of individuals and the community is affected by the sanitary condition of dwellings and public buildings, which condition is largely dependent upon the manner in which the plumbing and sewerage is performed; and

WHEREAS, Many persons are going into the business of plumbing and sewer-building who lack that thorough knowledge of the principles and practice of the trade necessary to proper sanitary construction; therefore

Resolved, That a board of examiners should be established by ordinance, as has been done in eastern cities, for the purpose of examining persons who propose to conduct the business of plumbing or sewer-building in this city, who should be authorized to issue licenses only to such as should pass satisfactory examination.

Resolved, That such board should have among its members the city civil engineer, the engineer of the water-works, the health officer and one master plumber.

Resolved, That these resolutions be communicated to the board of health with the request that they take such action as may seem best to secure the legislation necessary to carry them into effect.

Arrangements were made to invite a lecture from Dr. G. C. Ashmun, health officer, on March 17. Mr. John K. Allen, associate editor of THE SANITARY NEWS, being present, was invited to address the association, and responded at some length on the work of such associations. By a vote the secretary was requested to forward THE SANITARY NEWS reports of the proceedings of the association for publication.

At Washington, D. C.—The list of new officers of the master plumbers' association is as follows: President, Edward J. Hannan; vice-president, Thomas W. Miller; secretary, Theodore Fritz; treasurer, Henry C. Thorn; corresponding secretary, T. V. Noonan; sergeant-at-arms, W. W. Dougherty.

At Syracuse, N. Y.—An association was recently organized among the master plumbers in Syracuse, and the following officers were elected: President, Alfred Tily; vice-president, F. E. Carroll; secretary and treasurer, Charles G. Hanchett. The names of the other officers are Edward Joy, P. J. Gilroy, James Murphy, Robert McClure and Charles P. Samuels. An excellent spread was furnished the association at its last meeting, by the president.

At San Francisco.—The annual meeting of the association was held on Feb. 7 with the following result: President, James Shepard; vice-presidents, William F. Wilson, M. C. Kean and G. Sweeney; treasurer, William Enright; recording secretary, I. C. Connor; financial secretary, William E. Lane; corresponding secretary, J. L. E. Firmin; trustees, William L. Daniel, John T. Gray and James McGibney; auditors, R. A. Vance, Charles Downes and William Snook; sergeant-at-arms, M. Lasswell. At the meeting held upon the 21st, attention was given to the subject of state organization, and discussion was had upon separate specifications for work, by the architects. The association thought that the plumbers should have the control of the laying of sewer-pipe tot he line of the sidewalk, whether of iron or iron-stone, otherwise they might be held to account for faulty workmanship, especially as the iron-stone is now laid by ignorant and unskilled laborers. The matter was placed in the hands of a committee to confer with the chapter of architects.

BOARD OF HEALTH.

At Davenport, Iowa.—At the annual meeting of the city board of health, recently held, the annual report of the city physician, Dr. A. W. Cantwell, was received. There were 60 cases of scarlet fever and 136 of diphtheria during the year. The system of placarding the houses and keeping children exposed away from the schools had worked satisfactorily and kept the schools in a healthy condition. For the first time in the history of the city it has a city scavenger who performs his work satisfactorily with his odorless apparatus. The most of the night-soil was delivered to suburban gardeners. The report called attention to the need of more and better sewerage. The health officer regretted that the sewer ordinance, which worked so well, was declared unconstitutional. There had been a general observance of the rule requesting private funerals in cases of death from contagious diseases. The quarantine ordinance was truly beneficial. The chief of police and his men acted as deputy health officers in preventing the landing of persons affected with contagious diseases until proper means were employed for their removal. Several times the city physician was called upon to decide as to what should be done with steamboat passengers who were brought there ill, and generally the captains concluded to take care of them. The expenses of the board for the year were $1,651.90. The city scavenger removed a total of 117,256 feet of night-soil, and the city marshal 1,542 loads of garbage, ashes, etc., from the alleys, streets and yards. Garbage was removed from 147 private dwellings, at a cost of $875. Among the discussions had was one relating to a proposed organization of a plumbers' association. This was regarded very desirable from a board of health point of view.

NOTES AND NEWS.

ANNOUNCEMENTS.

March 21, at Memphis, sixth annual meeting of the sanitary council of the Mississippi valley.

March 26 and 27, at Bardstown, Ky., meeting of the State Sanitary Council, under the auspices of the State Board of Health.

April 17 and 18, at Hillsdale, Mich., sanitary convention, under the auspices of a local committee and State Board of Health.

August 21–27, at the Hague, fifth session International Congress of Hygiene, Dr. Overbeck de Meyer, secretary.

OUTSIDE BUILDING NOTES.

A very handsome building has just been built in Cincinnati, at the southeast corner of Sycamore and Fourth streets. It is said to be the most perfect in all its apartments of any building in the country, not excepting New York or Philadelphia. It is known as the Ortiz block. The architecture was designed by Mr. Samuel Hannaford, of Cincinnati. The dimensions are 100x140 feet. It is seven stories high, with a basement under the whole structure. The ground floor is divided into six stores, and the upper floors will be used as flats. The plumbing was done by Mr. James A. Gibson. The entire waste of the building is conducted into a large trap, or cistern, six feet in diameter and eight feet deep, underneath the basement, which discharges through a twelve-inch pipe into the sewer. All soil and waste-pipes extend to and above the roof, and the cistern is ventilated by a system of pipes to and above the roof, through which a positive current of air is constantly established. All the hot and cold water pipes, of which there are at least ten thousand feet, are of brass, the only building in this country, it is said, in which brass piping is used exclusively. There are twenty-seven bath-tubs, all of which are of extra heavy copper.

Architect M. Rumbaugh, of Mansfield, O., has completed plans for a reformed Presbyterian church at that city, to cost about $10,000.

LIGHTING.

The Cook county gas company asks of the Hyde Park board of trustees the privilege of furnishing the village with gas for 50 years, at a rate not to exceed $2.75 a thousand feet, whereas the Chicago gas light and coke company offers to furnish gas in the city at $1.00 per thousand.

It is stated that a new process for producing electric light has been brought into use in England, without the aid of either engines or dynamos. All that is required are the ordinary metals and carbons and a peculiar kind of acid. These are put into a cell, and the electric force immediately begins to develop. The new light, which is called the Acme, it is said, will be admirably adapted to country residences, yachts, etc., and can be produced at an expense of about £50 for 20 lamps of 20-candle power.

WATER-SUPPLY.

An ordinance is pending in the Chicago city council providing for inspectors to examine buildings, to see why water is wasted.

A leak was discovered in one of the main pipes in Michigan City, Ind., the other day. One hundred thousand gallons of water had escaped each day. Double the usual quantity had been pumped for some time, and the commissioners were at a loss to account for the unusual demand on the pumping-works.

SEWERAGE.

At a recent meeting of the sewerage committee of the improvement association of the northwest side, Chicago, it was claimed that $50,000 damage had been done in a recent freshet, through the incapacity of the sewers to carry off the water. This is not an unusual complaint, as the sewers have repeatedly failed to do all that sewers ought to do.

PLUMBING AND DRAINAGE.

Mr. T. P. Tuite, a leading plumber of Detroit, says that there are not twenty buildings in that city properly plumbed. He designates, as particularly bad in this respect, the city hall, the market building and the post-office.

The Durham house drainage company has the contract for the plumbing, gas-fitting and drainage of the new Pullman office building, this city. The same company, through its representative, Mr. E. C. Cauvet, of Minneapolis, has a similar contract for West's hotel at Minneapolis.

CONTAGIOUS DISEASES.

Dr. F. C. Sheldon, of Pasadena, Los Angeles county, Cal., makes a report to the state board of health which apparently illustrates the contagiousness of diphtheria. He says: "A child arrived with the disease contracted in Michigan, or en route over the Southern Pacific railroad. From this case it spread, and now there are four or five cases at least, and the disease is of a very malignant type."

Senator Pruden, of the Ohio legislature, has a bill which provides a sinking fund at Cincinnati, with a view to establishing a branch hospital for epidemics, such as small-pox, instead of treating them at the pest-house.

DEATH-RATES.

The death-rate in twenty-six localities in California, as reported to Dr. F. W. Hatch, secretary of the state board of health, was 0.11 higher in January than for the preceding month.

The annual death-rate in San Francisco for January was 20.11.

MISCELLANEOUS.

An amendment to the building ordinances in this city is proposed, whereby all buildings erected hereafter, over 90 feet high, shall be constructed throughout of incombustible material, excepting windows, interior finish, and floors, the last to be laid on the concrete, and the roof boards to be covered with an incombustible material.

It is stated that fully one-half of the milk supplied in Milwaukee comes from cows which are swill fed. Dr. Martin, the health commissioner, has been and is now waging vigorous warfare against the improper feeding of cows.

Mr. Stephen H. Long, of this city, claims to have a process for the discovery of adulterations in butter. The apparatus is said to consist of a spirit lamp, a small pan and a chemical. Melted butterine in the pan is allowed to come to the boiling point, when the chemical is added. The butter comes to the top and the coloring matter goes to the bottom, all in between being lard or suine, or whatever adulteration may be used.

There are 1,191 beds in Chicago hospitals, and, at last report, 1,009 patients. During the present year 245 more beds will be provided.

Senator Lewis' bill to regulate the practice of medicine and establish a state board of health for Ohio, was, on his own motion, postponed until next winter, in order to secure the opinion of the people on it.

The finance committee of the city council has reduced estimates made by the various departments of the Chicago city government for the current year, to the following figures: Cleaning and repairing streets, $180,000; canal pumping-works, $65,726.50; health department, $100,655 (this does not include cash which, it is estimated, will be received from miscellaneous sources); sewerage maintenance, $94,572.90; sewerage construction, $259,325.

Architect H. A. Linthwaite, of Columbus, O., is preparing plans for a Wesley chapel M. E. church and Sunday-school room combined, to be built in that city on the corner of Broad and Fourth streets, at an estimated cost of $50,000.

Architect F. Herr, of Dubuque, Iowa, has under way the Mount St. Joseph's academy, to cost $25,000, and a chapel for the Sisters of St. Francis, to cost $10,000, both at Dubuque, and the Sacred Heart college at Prairie du Chien, Wis., to cost $50,000.

Dayton has over eighty doctors and no sewerage system.—*Dayton Daily Democrat*

Several cases of glanders have been recently discovered in this city among horses in sale stables. The infected animals were promptly shot by the state veterinarian, and others which had come in contact with them quarantined.

A NOVEL device for protecting a room from the gaze of passers-by, without materially obstructing the outlook, is found in the new glass curtain. It is made of strings of small crystal beads fastened at one end into a narrow strip of wood which fits across the sash, and hanging from this, it covers the lower half of the window. These strings are placed close together, and the different colored beads may be arranged to form a pattern. One of the screens of white beads has a cluster of blue flowers in the center, and a border on either side, of a double row of larger turquoise blue beads. If the work is carefully done, excellent color effects may be obtained, the beads taking the light well; and this arrangement is far more satisfactory than any of the cheap substitutes for stained glass, most of which are neither artistic nor durable.

Ground pepper may be adulterated with a finely-ground preparation of the kernels of olive berries. It may be detected by casting a sample of the pepper on a mixture of equal parts of glycerine and water. The pepper will float while the ground olive berries sink.

SANITARY APPLIANCES.

[*Under this head* THE SANITARY NEWS *will publish, in each issue, a complete record of all the latest patents of sanitary appliances issued at the United States patent office. Cuts will be reproduced of such as seem to have special merit. Single copies of printed specifications and drawings of any patent will be forwarded by* THE SANITARY NEWS *on receipt of twenty-five cents.*]

293,436. APPARATUS FOR CONSUMING SMOKE IN FURNACES. James Elliott, Montreal Quebec, Can. Filed Sept. 6, 1883.

293,491. ROOFING FABRIC. Henry M. Miner, Philadelphia, Pa., assignor to Charles Barclay, same place. Filed June 22, 1883.

It is composed of a central burlap, or similar fabric, saturated with tar, and faced underneath with tarred paper, and on top with sand or pebbles, and compressed.

293,492. MANUFACTURE OF ROOFING FABRICS. Henry M. Miner, Philadelphia, Pa., assignor to Charles Barclay, same place Filed June 27, 1883.

293,506. PISTON WATER-METER. William R. Park, Taunton, assignor to the Equitable Water Meter Co., Boston, Mass. Filed Dec. 5, 1883.

293,515. STOP-COCK. John Porsch, Jr., Erie, Pa. Filed April 12, 1883.

293,523. FIRE-PROOF BUILDING. John J. Schillinger, New York, N. Y. Filed Oct. 10, 1883.

293,524 and 293,525. BUILDING BLOCK, and MACHINE FOR MAKING BUILDING-BLOCKS. (See preceding.)

293,533. UNDER-GROUND WIRE-CONDUIT. Thomas L. Smith, New York, N. Y., assignor to Daniel A. Matthews, same place. Filed Dec. 14, 1883.

293,559. LAMP. Lewis Olson Breeke, Decorah, Iowa, assignor of one-half to L. E. Davidson, same place. Filed Aug. 23, 1883.

293,578. CAR-VENTILATOR. Owen H. Jones, Hartford, Conn., assignor of one-half to Frank C. Smith, New York, N. Y. Filed Feb. 15, 1883.

293,740. METHOD OF PURIFYING WATER. Isaiah Smith Hyatt, Morristown, N. J. Filed Sept. 20, 1883.

293,741. FILTERING MATERIAL. Same patentee. Filed Oct. 6, 1883.

293,742. FILTER. John W. Hyatt, Newark, N. J. Filed Dec. 28, 1882.

293,743. FILTER. Same patentee. Filed Aug. 11, 1883.

293,744. FILTER. Same patentee. Filed Aug. 21, 1883.

293,745. FILTER. Same patentee. Filed Aug. 21, 1883.

293,746. ART OF FILTRATION. Same patentee. Filed May 28, 1883.

293,747. ART OF FILTRATION. Same patentee. Filed June 18, 1881.

293,748. ART OF FILTRATION. Same patentee. Filed Aug. 11, 1883.

293,749. ART OF FILTRATION. Same patentee. Filed Nov. 3, 1883.

293,750 APPLIANCES FOR FILTERING. Same patentee. Filed Aug. 1, 1883.

293,752. COVERING FOR STEAM-BOILERS, PIPES AND OTHER HEATED SURFACES. Edward Krahenbeihl and Paul Rice, Allegheny, Pa. Filed Oct. 10, 1883.

293,776. CHAMBER-PAIL. Chas. H. Paulus, Irvington, N. J Filed Aug. 27, 1883.

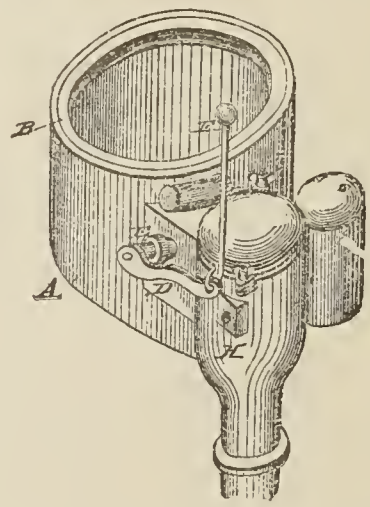
293,848. PIPE-WRENCH. Daniel S. Brown, Burdette, N. Y. Filed Jan. 8, 1884.

293,854. APPARATUS FOR THE MANUFACTURE OF ILLUMINATING GAS. Wm. H. Douglass, Philadelphia, Pa., assignor to the North American Petroleum Gas Co., New York, N. Y Filed May 25, 1883.

293,880, 293,882 and 293,883. ART OF FILTERING WATER. John W. Hyatt, Newark, N. J. Filed Dec. 27, 1883, and Jan. 29, 1884.

293,912. CHAMBER-PAIL. George L. Reynolds, Orange Valley, N. J. Filed Dec. 18, 1883.

293,935. WATER-CLOSET. Nicholas Barry, Jr., Muscatine, Iowa. Filed May 10, 1883.

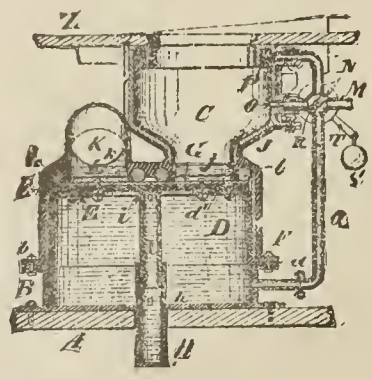


293,997. APPARATUS FOR RAISING WATER. Thomas Arthur, Bangor, Pa., assignor to himself and Robert Nagle, same place. Filed March 7, 1883.

294,016. CAR-VENTILATOR. William E. Cowen, Defiance, O. Filed Oct. 9, 1882.

294,150. BATHING APPARATUS. John Ransom, Williamsport, Pa. Filed June 15, 1883.

294,185. WATER-CLOSET. Emil Bande, Cincinnati, O. Filed July 18, 1883.



The characteristics are a soil-hopper, or bowl, and a soil-pipe, both ported downward and at the same level, a valve whose gravity during the use of the closet opens both ports simultaneously, and which, on vacation of the closet, closes both ports simultaneously by pressure of the water-supply, a four-way cock and an operating instrumentality

294,201. APPARATUS FOR INDICATING TEMPERATURES OF DISTANT ROOMS. Wm. R. Comings, Norwalk, O. Filed Aug. 27, 1883.

294,210. PUMPS. Joseph W. Douglas, Middletown, Conn., a signor to himself and W. and B. Douglas, same place. Filed April 6, 1883.

294,327. DEODORIZING AND DISINFECTING APPARATUS. Geo. Nobles, 27 Dudley Grove, Harrow Road, County of Middlesex, assignor to John Wm. Raimes, Acaster Malbis, England. Filed April 20, 1883.

294,339. PIPE-CUTTER. Wm. L. Sweetland, New Haven, Conn., assignor of one-half to Felix Chillingworth, same place. Filed Nov. 28, 1883.

Current Topics.

The attention of readers is invited to the instructive article on the sewerage and water-supply of Youngstown, Ohio; the article on comparative effects on health of coal-gas and water-gas; the concluding deductions by Dr. Eklund on the sanitary administration of Sweden; the Presbyterian hospital; the ventilation of the Farren school; the manufacture of sewer-pipe, and the editorial comments on sanitary movements. The reviews of current publications, notes and news, and proceedings of sanitary associations are unusually full.

In another column are printed the resolutions adopted by the Sanitary Council of the Mississippi valley at the meeting held at Memphis, Tennessee, March 21. There appears to have been a general representation present from the various states, prominent members from the boards of health of Michigan, Mississippi, Illinois, Tennessee, Arkansas, Missouri, Minnesota, being in attendance, as well as others from Louisiana, and elsewhere. There was considerable feeling displayed relative to the conduct of the marine hospital service, but, by a bare majority, the resolutions finally adopted were of a cautious and prudent tone, to avoid unnecessarily antagonizing influences that might hereafter become more friendly, efficient and valuable. The actual purpose of the council was doubtless accomplished by the adoption of the resolution which continued the organization, and authorized the executive committee to adopt the same line of action, if needful, in regard to the prevention of the introduction of yellow fever, and other pestilential diseases, into the Mississippi valley, as governed them in 1883. The election of the full complement of officers for the ensuing year gives an organization ready for work should occasion present itself, and independent of all national board, or marine hospital service, or other complicating entanglements. In a word, the states directly interested in the preservation of the health of the Mississipi valley have in this sanitary council an organization, voluntary and inexpensive, which will be on the alert to guard the public welfare and health, not only against invasions of yellow fever, but against cholera, small-pox or kindred pestilence.

If interest lags in a master-plumbers' association, it may be revived by bringing up the question as to the abolition of contract work. All plumbers recognize the fact that if a scale of job prices could be adopted and maintained, it would be a great benefit to the trade. In the city of Cleveland there is no adequate profit in large jobs of work, simply because the contract system prevails, and the plumbers who are prepared to undertake large jobs underbid each other seriously. This is the case in other cities than Cleveland, but a good example is there afforded. The plumbers there recognize the desirability of a schedule of prices, but they do not pull together well enough to accomplish this result. A little co-operation, good fellowship and desire for the best interests of the trade will accomplish this reform.

The adulteration of milk and milk products has attracted the attention of the public health committee of the New York Senate. The result of their investigation is that they find two-fifths of the milk furnished the city of New York in 1882 was watered or skimmed. The report recommends the appointment of a state milk inspector, and is accompanied by a bill containing a $33,000 appropriation clause.

Professor Van Overbeck de Meijer, of The Hague, general secretary of the international sanitary congress which is to convene there in August next, has addressed a letter to The Sanitary News stating that it is the wish of the committee of organization that an American sanitarian, who can address the congress in the French language, should so address them on the sanitary features of the emigration of Europeans to the United States. The committee have reserved the place of honor for this paper at the general meeting August 25. The Sanitary News is requested to name some person who will read a paper on this or some other subject at that time. Will some eminent American sanitarian volunteer? If so, his name will gladly be communicated to Dr. de Meijer.

Cattle are more valuable than human beings,—at least, they are viewed in that light by the present congress. An appropriation is made of $50,000,000 to restrict the spread of the foot-and-mouth disease now alleged to be prevailing in Kansas, while not one cent is appropriated to stay an epidemic of diphtheria which prevails in every state. A special session of the legislature is called in Kansas and a bill passed providing for a state veterinarian in less than a week after the alarm becomes general. But no especial anxiety is evidenced to pass a bill providing for a state board of health; yet more people die from contagious diseases in a year than cattle. Mr. Longfellow was entirely wrong when he gave his advice to "be not like dumb, driven cattle." If the people of Kansas were literally like dumb, driven cattle they might have something done to lengthen their lives. Why is this? Because we cannot sell our children, while we can our cattle. Hence the children die and the cattle are protected.

The sanitary authorities of Rio Janeiro have made desperate efforts to destroy the centers of yellow fever contagion, but in spite of all their exertions, the disease is on the increase, and the deaths vary from two to nine daily.

Building all over the country seems to be full of promise for the coming season. The class of buildings which are to be constructed in different cities are of the larger kind, and of the better order. It is probably true that there will be many of the smaller buildings put up, but these do not attract attention at present. As this year will probably eclipse other years in the construction line it is important that the officers in those cities which have not a series of regulations governing the sanitary construction of houses should bestir themselves and have such regulations enacted.

The bill to provide for the establishment of a state board of health in Ohio, which was endorsed by the state sanitary association, provided that the board should consist of nine physicians, one sanitary engineer and one attorney-at-law. The representatives of the master plumbers' association of Cincinnati, who were present at the meeting of the sanitary association, when it endorsed the proposed bill, and others'

attempted to induce the committee to give the master plumbers a representation on the board, but without success. The association was one composed principally of physicians, and it was, perhaps, natural that the bill should be a doctor's bill. The bill will probably not pass, as, in addition to the voluminous state board of health portion of it, there is a still more voluminous provision for the regulation of the practice of medicine. There were many arguments advanced by some present to endeavor to have the two reforms presented to the legislature in separate bills and allow them to pass or fail on their own merits. It is believed that there are many people who will accede the desirability of a state board of health who do not see the necessity of regulating the practice of medicine, and that a bill to provide simply for the former will pass the Ohio legislature, while one in which both features are coupled will fail. The composition of the state board of health is a feature which is of prime importance. The board should consist of nine sanitarians, not "nine physicians," who may or may not be sanitarians. Under such wording, the master plumbers should have recognition, because they are, of all classes in cities, most interested in sanitary science. Physicians, as a class, are not interested in sanitary science save as it affects the practice of medicine..

High buildings have proved to be so remunerative to capitalists in Chicago, that many more will be erected the present season. During one week recently, permits were granted by the building department for two ten-story, three nine-story, one eight-story and one seven-story buildings.

It is said that in the ventilation of the immense trade room of the new Chicago chamber of commerce the air will be completely changed each five minutes.

As suggested, in a recent issue of The Sanitary News, a substitute for the national board of health bill now before congress is being considered by the public health committee. It is entirely different in its conception from any previously recommended board. The proposition is to form a board from the surgeon generals of the army, the navy, and the marine hospital service, the treasury department to have charge of quarantine and the navy to do the investigating into sanitary subjects.

W. R. Coats, C. E., who is in charge of the development of a water-supply for Lansing, Michigan, has succeeded, apparently, far better than any other city in the state. He finds the city to be in a water-bearing basin, having an aggregate water-shed of over fifty square miles, and receiving an annual precipitation of thirty-six billion gallons. He states that the discharge from a two and one-half-inch iron test tube, at a point ten feet above the level of the river, was over three hundred gallons per minute, and also adds that "this surpasses anything of the kind on record, either in this country or in Europe."

If there is any virtue in distributing documents on the restriction and prevention of contagious diseases, it is shown in the following statement: There were reported in Michigan in the year 1881 something over two thousand deaths from diphtheria. In October, 1881, the state board of health of Michigan began to distribute in large quantities, and in various languages, documents on the restriction and prevention of diphtheria. The distribution of these documents was continued throughout the year 1882. In that year the deaths reported from diphtheria were about fourteen hundred. There were not as many deaths reported from all causes as in 1881, to be sure, but the proportion of decrease in 1882 as compared with 1881, was much greater in deaths reported from diphtheria, than in those from all causes. That this vast decrease of nearly thirty-three and one-third per cent is due in a great measure to the distribution of these recommendations, there is no doubt.

Gas is an important factor in the sanitary problems of the day. Its usefulness as an agent of light, has long been recognized, but its value as a means of generating heat for cooking, and warming the house has not been so widely accepted. It is a very satisfactory fuel for cooking, the heat being easily regulated. It is also very desirable to warm houses by steam, and generate the steam by burning gas under the boilers. The annoyance constantly arising from ashes and cinders can thus be avoided, and the expense of firing is done away with by this process. The increasing consumption of gas is an indication of the truth of these observations.

It is not likely that lead soil-pipe is much used now in new work, and quite certainly not that which is seamed. But there are additional reasons, it appears, why it should not be used at all. From such investigations as those made by Dr. Chamberlain, it is found that the lead is liable to corrode at any time and become full of holes. This corrosion may be hastened by the impurities in the lead itself, and, in these days of adulteration, pure lead is the exception as well as pure food. House drainage should be constructed of such material that it will not only stand a severe test when put in place, but remain intact during all the years of its use.

Stale bread has always been known to be more easily digested than new bread. The cause of this has been determined by Bouissingault to be a difference in the molecular state of the bread. When new, the bread is soft and elastic, and the mastication of new bread only serves to make it more resistible to the digestive juices. The molecular condition changes during cooling, and may be restored again by heating to 156 Fahr., when it will have the characteristics of new bread.

Dayton is behind most of her sister cities in Ohio in the matter of sewerage. Not only has nothing been done as yet, but there is a tendency in the common council to defeat all projects for future work. The health officer has repeatedly urged the importance of the subject upon the council. In a recent communication he states the number of wells and privy-vaults to be eight thousand each, and, as a matter of course, most of the former have been contaminated by fecal matter. The articles on the sewerage of Nahant, by E. W. Bowditch, C. E., recently published in The Sanitary News, show that wells contaminated by excreta will recover slowly, if the cause of contamination is removed. This is an important fact, as in all cities wells will, in many cases, be used after a public water-supply has been introduced.

SEWERAGE AND WATER SUPPLY OF YOUNGSTOWN, OHIO.

Youngstown is a little city of about twenty-one thousand inhabitants within its limits, but just outside of the city are the suburbs of Brier Hill, Crab Creek and Hazelton which really belong to it. It is situated in the Mahoning valley, on both sides of the Mahoning river, which runs through it indirectly from northwest to southeast. The oldest principal portion of the city is on the north side of the river from which we get our water supply, and into which our sewage is conducted. The valley in which Youngstown is situated is composed of rich alluvium upon irregular beds of sand and gravel, and is from one-half to one mile in width. The elevated sides of the valley are underlaid with a shale that is always found above the coal, and is from ten to twenty-five feet below the surface, and generally water-tight. Upon this latter formation the main parts of the city are built; the great importance of sewerage will at once be seen, the surface being shallow and easily water-soaked.

SEWERAGE.

On account of the sloping and, in places, abrupt sides of the valley, the natural drainage is good. It is when the flat valley is reached that the difficulties in drainage are encountered. The sewerage history of Youngstown is similar to that of most villages, nothing being done until the filth and stagnant water upon Federal street, which is the principal one, and one or two others, compelled their removal, which was done by the construction of cheap sewers here and there along the streets—simply makeshifts for temporary needs, and of no use as permanent improvements, but costing about $15,000. All of these have since been taken up and this money wasted.

About the year 1866 a spirit of general improvement seized the people, and, in 1868, a charter being obtained making it a city of the second class, a city council was elected on the issue that the streets should be uniformly graded and improved, then sidewalked, sewered, etc. These improvements have been vigorously pushed from that time to this date, giving us a sewerage system costing to date about $177,500.

The city has employed since its existence three or four civil engineers. Mr. James M. Reno, the present city engineer, has planned and executed the present system of sewerage and all other improvements. He has advocated the system of combined storm and house sewerage, as our city is situated, and has carried the city council with him against the remonstrance of the board of health, a member of which I have been a portion of the time since its organization. Our sewers are, therefore, large in size, and built of brick or vitrified pipe. Our main sewer is built in the lowest part of the valley, of brick, twelve inches in thickness, is seven thousand nine hundred feet in length, is eighty-four inches in diameter at its mouth, gradually falls off to sixty inches at its terminus, and cost $98,362.17. We also have on the various streets nine thousand seven hundred and twenty-one additional feet of sewers built of brick, ranging from forty to eighteen inches in diameter. There are sixteen thousand two hundred and thirty-two and a half feet of sewers built of vitrified pipe, and ranging in diameter from twenty-four inches down to six inches. The length of our sewer system in use at this time is about seven and a half miles, and cost $162,500. This estimate does not include house connections, or private sewers.

Our sewers are all supplied with man-holes, the base of each being about three and one-half feet in diameter, having a pocket built two feet below the sewer, so the inspector can more easily examine them. The top is about twenty inches in diameter, and covered with an iron ring and lid. For the larger sewers they are built at the side, and built in with the arch. The catch-basins are built of brick and cement-mortar, and connected to the sewer with vitrified pipe, eight to twelve inches in diameter, having an elbow of the same size connecting the pipe to the catch-basin in such a way as to prevent heavy substances from entering the sewer, or gases from blowing out from the sewer.

The rules governing the construction of house connections with the large sewers are as follows: "The least inclination allowed for water-closet, kitchen and all other drains, of not over six inches in diameter, liable to receive solid substances, is one inch in four feet. All pipes that must be left open to drain cellars, areas, yards or gardens, and all house connections with kitchen-sinks, wash-bowls, bath-tubs, or wash-tubs, must be connected with suitable catch-basins, the size, form and construction of which are to be prescribed by the officer of the city. All connections with pipe-sewers are made with Y branches, and may be laid with vitrified pipe to the houses, and cast-iron pipe connected with the sewer pipe outside the house, and carried inside through the house and out at the roof at its highest point, this whole pipe to be without any traps between the street sewer and the top of the house. Water-closets may be connected with this pipe at any point in the house above the cellar with a Y. No soil or drain pipe within the premises is allowed to be connected with a flue or smoke-stack. Persons violating the above rules are liable to a fine of not less than $20 nor more than $50, together with the costs of prosecution."

The catch basins used for house connections, are the conception of our city engineer, and are found safe and efficient. They are each shaped like a tobacco pipe; all the fluids, together with the rain water, are received over the top of the bowl, which retains the grease, until a heavy rain or flushing removes it through the stem of the pipe. Perhaps the most efficient sanitary measure ever completed in Youngstown was the complete removal of the filth-sodden earth of the principal street, and the bottom then prepared with new material; upon this granite blocks were placed and between them hot sand and gravel sifted into the crevices, and upon the top of these paving cement heated to 350° Fahrenheit was poured, thus filling up effectually every crevice, and at the same time uniting firmly the whole pavement, rendering it completely water and filth proof, and compelling everything to pass into the catch-basins that had not previously been removed by scraping or sweeping. The eastern part of this street was prepared as above, but protected by an asphalt covering; although a very expensive improvement it is durable and fully meets the expectations of its advocates. Great difficulty has been experienced in getting the property-holders to make house and privy connections with the sewers. The board of health has used its utmost exertions to abate the old form of privy-vaults, and substitute the dry-earth system. It is now meeting with partial success. Most privies now built are placed upon boxes which project at one end about a foot beyond the building, thus rendering easy access to the box for cleaning. This box is about sixteen inches in depth, and into it there is placed, daily, either lime, coal-ashes, or road-dust. Many houses also have small dry-earth commodes. It is the unanimous opinion of the health board that, for protection, efficiency and cheapness, this plan far surpasses all other modes of disposal of privy contents.

Is our system of sewerage the right one, and has it secured for us what we desired? I think not, for the following reasons: The sewers are too large, and they cannot be flushed except when violent floods occur, which are too infrequent and irregular to rely on. The result is that peculiar soapy and greasy filth adheres to the sides of the sewers, and so remains to decompose and generate poisonous gases throughout the entire year. Again, the catch-basins which are intended to hold more than a foot of water, thus covering the mouths of the elbow pipes which carry the sewage from the catch-basins, dry out during the hot months, and thus a festering mass of filth is left to poison the air. Then again, it has been, in our own case, beyond the power of the engineer and board of health to secure, in any regular way, either their cleaning or flushing. As the sewers are

built by contract, and in many places, their sites, and also those of the catch-basins, are springy, and should have been previously thoroughly drained by sub-soil pipes, nothing of the kind has been done, and the pressure of the ground-water has carried away the cement, rendering them leaky, so that, in very dry seasons, much of the sewage passes into the soil—defects which are grave and dangerous, and should never exist. In this last charge, I am pointedly contradicted by our city engineer, who asserts that the sewage will not pass into the sub-soil even if the sewer has openings in its bottom, as the earth is always sufficiently damp to prevent further absorption, and the tendency is for fluids to pass along inside the sewer at all times. This he affirms to have proved to his satisfaction, by examining the substrata of imperfect sewers taken up by himself. In answer to the question what other civil engineer, or sanitarian, corroborated him, he replied that he did not know of any, and supposed he stood alone, as all that he had read upon this subject was against him. Is he correct in this?

Then again, with the present system of disposing of house-sewage, which is the foster-mother of typhus and typhoid fevers, scarlet and yellow fevers, diphtheria, cholera, and doubtless numberless other forms of zymotic diseases, these diseases are not, and, in my opinion, never can be effectually prevented. Added to this, the smallest house connection is six inches in diameter and in opposition to the engineer many houses have eight, ten, and in some instances, twelve-inch pipe, all of which are entirely too large and cannot be either properly flushed or ventilated. Again, no provision has ever been made for flushing these house pipes, and they are, in consequence, festering beds of filth in many instances. I will add to this that only about one-fourth of our town has even this kind of sewerage for protection, and at a cost of nearly $177,500. Suppose all of it was sewered on the same plan, the cost would be about $710,000,—a burden too heavy to be borne by the tax-payers.

As the system of sewerage above described is substantially that adopted the world over, the question of vital importance to every people is, can anything better be had? In my opinion something better can be, and I refer to Memphis, and some of the smaller towns in the east as confirmatory. The essential features of this new system, which is known as Waring's, are: (1) Complete separation of house sewage from storm-water and street-sewage; (2) small iron pipes to each house, not more than four inches in diameter, carried to the highest point in the roof, and without traps; (3) where these small pipes join, automatic flush-tanks are located, emptying their contents into the said pipes every twelve or twenty-four hours, which thoroughly clean them of obstructions; (4) man-holes placed at proper intervals for the ventilation of the sewers.

What is the comparative cost of these systems? I can only approximate it. Our sewers cost us a fraction more than $4.25 per foot. Mr. Waring, in his report to the city of Canton, O., in October, 1880, estimates the cost of the system his name bears at a small fraction over 77 cents per foot. Of course, for the complete sewerage of a city another set of storm-water and street sewers must be added.

WATER-WORKS.

Our system is the Holly. The works were built in 1871 and 1872, and cost $175,000; but, by the addition of new mains and other expenses, the present cost is about $250,000. Our pipes are cast-iron, dipped, and range in size from four to fifteen inches. The capacity is three million gallons daily. The amount pumped daily is one million gallons. For domestic use the pressure is usually about seventy-five pounds. For fire purposes it is from one hundred to one hundred and fifty pounds. The pumps are the Holly gang,—two rotary and a Worthington. The rotary pumps have been removed as unsuitable. We have different means of purifying the water, according to the pumps used. When using the Holly gang, water is drawn from a crib in the river, which is fifty feet long and twenty feet in width, made of plank and filled with gravel and sand, and covered, but with numerous openings in the top. From the bottom the water is drawn after having passed through the above substances. With the Worthington pump, the water is drawn from a well which is filled from the river; it is thirty feet in depth and sixteen feet in width. Purification by sedimentation is relied on, and at stated times this well is completely emptied by a steam syphon, when the sides and bottom are thoroughly scraped and washed. We find these means fairly successful, in preparing the water for use; but the stains noticed during all freshets and high water are not removed. Water can be pumped by this system to a hight of 190 feet. Our state law protects the river to an extent of ten miles beyond the city limits. Our authorities guard the Mahoning for five miles above the water-works. The prices charged for water are as follows:

Any house less than five rooms	$5.50
Each room additional	1.50
Bath Tub	3.30
Fountain for Season	3.30 to 6.60
Street Washer	9.00
Water Closet, Private	3.30
Water Closet, Public	5.50
Urinals	3.30

According to state law all water used by the city for fire purposes, flushing gutters and streets, public fountains, schools, etc., is not paid for. The superintendent thinks about one-half the water pumped is wasted, or not paid for. We find, for subduing fires, the Holly system is excellent; two thousand gallons per minute can be thrown. The expenses yearly are about $9,400, and the receipts about $14,400. We are able to pay for repairs, make additions, and still have money enough to pay interest on the water-works bonds. Up to date about fifteen and one-half miles of mains have been laid.

I am indebted to Mr. S. W. McKeown for a careful analysis of the water of the Mahoning river, just completed for this paper and expressed in parts per 100,000, which is as follows:

Inorganic matter in suspension	0.47
Organic matter in suspension	0.07
Carbonate of lime	8.62
Sulphate of lime	1.74
Oxide of iron and alumina	0.66
Sulphate of magnesia	5.40
Chloride of sodium	1.24
Carbonates, soda and potash	1.80
	20.00
Organic matter in suspension when water is very turbid	1.05
Inorganic matter in suspension when water is very turbid	6.72

The defects in our system are the following: The largest pipes are but fifteen inches in diameter, and should be twenty-four. The city has to depend on a single fifteen-inch main; if it should break during a fire, the city would be left wholly unprotected. Thus, is seen, the urgent necessity of having at least two sets of main pipes. Another necessity is the placing of two or more water tanks in different parts of the city, holding, say, one million gallons each, and kept constantly full, so that their contents can be used while important repairs are being made either upon the pumps or mains.

[The above is an article read by Dr. John McCurdy, of Youngstown, at the sanitary association meeting in Columbus, Ohio, February 13 and 14, 1884. The Sanitary News hopes soon to publish an article upon the system by James M. Reno, C. E., the designer of the system, which will answer some of the points brought out by Dr. McCurdy.]

GAS.

There is much discussion in different cities where coal-gas and water-gas are used, or about to be adopted, as to the relative merits of each as an illuminant, and as to their action on the system when respired. The coal-gas people very naturally look with suspicion upon a water-gas company when it proposes to establish itself in the same city. It is

possible that their alarm does not spring entirely from a fear that the commercial value of coal-gas may be disturbed, but that they really believe that water-gas is more dangerous to the public health than coal-gas. The ground upon which the accusation rests is that water-gas contains carbonic oxide in varying degrees (about 30 per cent), while coal-gas contains scarcely more than ten, in some States not more than 10 per cent of carbonic oxide being allowed by law to be present in illuminating gas. The sanitary portion of the question hinges partially upon the fact as to the poisonous or non-poisonous nature of carbonic oxide. Nearly all chemists unite in calling carbonic oxide a poisonous product, producing death if inhaled in sufficiently large quantities. The fact remains undisputed that coal-gas will, and often does, produce death when allowed to escape into a room occupied by a sleeping person, or one determined to commit suicide. The question arises, would a gas containing 30 per cent of poison cause death quicker than one containing 10 per cent, and, if so, enough quicker to make material difference in the recovery of a person from asphyxiation when discovered? Prof. Ira Remsen believes that there would be such a few minutes difference between the lengths of time when the same effect would be produced as to make no difference to the person. Bloxam states that 1 per cent of carbonic oxide mixed with atmosphere is sufficient to kill warm-blooded animals. This statement is hurtful to both gases. Granting that both are dangerous, even though they are so in varying degrees, it is not more detrimental to water-gas than to coal-gas, for the same protection to life must be observed in the use of both. Leaks, open joints, partially opened burners, etc., are dangerous when either kind is used.

Having been requested to describe the process employed in the manufacture of water-gas, THE SANITARY NEWS gives two processes for comparison. In making water-gas, the furnaces or gasogenes contain anthracite coal fully ignited. Steam (alternating with air to maintain the heat) is introduced into the gasogenes forming the so-called water-gas. This gas is conducted into carburetters containing naphtha vaporized by heat, which, uniting with the gas, passes into retorts highly heated, and forms a permanent gas. This gas then passes through condensers, scrubbers, purifiers, and station meters into the holders, ready for distribution. The only materials used are steam, anthracite coal, and naphtha. The gas is purified with lime. Coal-gas may be made from cannel and coking coals. A mixture of these coals and cannel is put into a highly-heated clay retort and the volatile portions of the coal and cannel, consisting of tar, oil and gases, are driven off by the heat, the gases are collected, condensed, washed or scrubbed, purified by hydrate of lime from the sulphur compounds, carbonic acid and all deleterious products, tested as to purity and illuminating power and stored in the gas-holders ready for consumption. The following are analyses of coal-gas and water-gas, made by Prof. Remsen:

COAL GAS.	PER CENT.
Carbon dioxide (carbonic acid)	0.0
Illuminants (ethylene, etc.)	4.3
Carbon monoxide (carbonic oxide)	7.9
Hydrogen	50.2
Marsh gas	29.8
Nitrogen (by difference)	7.8
	100.0

WATER GAS.	PER CENT.
Carbon dioxide (carbonic acid)	0.3
Illuminants (ethylene, etc,)	12.85
Carbon monoxide (carbonic oxide)	28.25
Hydrogen	30.3
Marsh gas	21.45
Nitrogen (by difference)	6.85
	100.00

Prof. Charles F. Chandler, of the school of mines, Columbia college, New York city, well-known as an expert on the subject of illuminating oils, has lately made an investigation into the subject of water-gas in its influences on health. He has made a report in which he says that water-gas, if used with the same cautiousness that coal-gas has to be used, is no more dangerous to health than coal-gas. This is probably the ultimate conclusion to be reached by every fair-minded investigator.

SANITARY ADMINISTRATION IN FOREIGN COUNTRIES—SWEDEN.—V.

BY DR. FREDERICK EKLUND, STOCKHOLM.

CONCLUSIONS.

In drawing conclusions from this short exposition, in which I have sought to lay bare the principal faults in our present medical administration, I may make the following summary:

1. Among the conditions of competency, to secure an appointment as director-general, or medical counsellor, it was formerly indispensable to be a graduate and doctor of medicine. The third clause of the first paragraph of the instruction to the medical direction, dated November 7, 1877, enacts that as well the director-general as the members shall be duly-authorized physicians, that is, licentiates of medicine. The annoying consequences of this voluntary degradation have already appeared and will probably become more evident from year to year; for example, at the delivering of opinions, and when there are recommendations for advancement and promotion. As a result of this, a member of the medical direction may be appointed who does not possess the highest degree of learning. There are in the kingdom a great many learned physicians with an extensive experience not only in a general way, but also in the different specialities of medicine, who do not receive these appointments.

2. Some are constantly in the wrong and take all pains imaginable to mislead public opinion as to the real duties of the physicians. In harmony with the great ideal that one is not to overtake, but rather excel, it ought to be the chief mark of every physician to cultivate his skill to heal the sick and suffering as completely as possible, and to be ready at every moment by night and day to succor the sick with necessary assistance; generally speaking it might be the duty of the physician, by reason of collected experience, to make it his study to prevent sickness. By far the surest means to eradicate quackery is to have physicians, through earnest and zealous study and much exercise, highly improved in dexterity to cure diseases even among the poorest with perfect success, above all the epidemical and common diseases. On the contrary, nothing contributes so largely to lower the reputation of, and the respect for, the physician as the circumstance that he is exceeded by every charlatan. As a consequence of the above-mentioned facts, it is evident that the first paragraph of the projected instruction for provincial, district and town physicians requires a total reform in conformity with my views.

3. To prevent disease arising and spreading we have great need of sanitary inspectors, at least one in every town and one in every district, when a provincial or district physician is appointed. Every medical man, who has devoted himself to matters of hygiene, knows that these examinations take very much, yes, very much, time for their accomplishment, with scrupulous exactness. Moreover, it is perhaps superfluous to observe here that the late laity, as royal commanders, masters of policy, bailiffs and sergeants in the districts, presidents and the many members of the board of health, and of the communal committees understand almost nothing of sanitary principles; and it is also true that a great many medical men do not possess the necessary qualifications to pursue hygienic investigations, which are the most difficult of all, since they take cognizance in a high degree of the patience, and require extensive and consummate learning, practical skill, much money, and above all philanthropy.

The next series of articles upon the sanitary administration of foreign countries will be upon the kingdom of Servia and will be from papers sent by Dr. Vladan Georgevitch, the medical officer of health of Belgrade. This series will prove very interesting, as it will cover the historical development of the health laws of Servia, its military hygiene, and its present sanitary administration.

THE PRESBYTERIAN HOSPITAL OF CHICAGO.

Previous to the inception of this hospital, there was but one Protestant hospital in Chicago, namely, St. Luke's. The need of a second Protestant hospital has been felt for some time, and the Presbyterians determined to erect this monument to charity A plat of ground was secured by gift, fronting on Congress and Wood streets. The architect is Mr. S. V. Shipman, of Chicago, and the building, when constructed, will be like the following illustration :

Its total estimated cost will be $100,000, and it will accommodate two hundred patients. Two small wings are now being constructed at an expense of $32,000, and will be completed about June 1, and will accommodate about eighty patients. The building seen on the right in the cut is the Rush Medical College, which the portion of the hospital now being constructed joins. The ventilation will be accomplished by introducing fresh air under the window-sills over steam radiators, and, in the wards, the foul air is to be removed by fire-places. The halls are to have a common shaft, heated at the bottom by a steam coil, for removing foul air. The water-closets, urinals, and baths have a separate foul-air shaft.

PLUMBING AND GAS-FITTING OF THE CALUMET BUILDING.

The new nine-story office building on LaSalle street, this city, known as the Calumet, has been unusually well built and equipped, from a sanitary standpoint. None of the work, from the laying of the first stone of the foundation to the inner decoration, was done by contract. This has made it an expensive building ; but its convenience, healthfulness, and lasting qualities, it is claimed, will make it a cheap building in the end. The desirable features of high buildings on small areas, to which The Sanitary News has repeatedly called attention, are here made prominent. All the rooms, from the first floor up, are well lighted and ventilated, well arranged and easily heated.

It is desired in this connection to call attention only to the plumbing and gasfitting. All of the water-closets and urinals are on the top floor and in the basement only, but these floors are easy of access by the two elevators which are kept constantly running. Double-flush, trapped closets are used, their outlets all leading to a single soil-pipe, six inches in diameter, extending to and above the roof. At present, the upper end of the soil-pipe is surmounted by a cowl ; but it has been suggested that this cowl will be removed and the soil-pipe left open to secure more certain ventilation and prevent the closing of the pipe by freezing of vapor. The soil-pipe is placed in a perpendicular shaft about 3x12 feet in size, extending from the basement to the roof ; in this shaft are placed, also, the gas, steam and water-pipes. This shaft not only serves as a ventilator for the basement, carrying off the hot and impure air, but, being warmed by the steam-pipes, it tends to create a movement in the soil-pipe, thus helping to ventilate it. The waste-pipes from the sinks and wash-basins are trapped with Bower's traps, and ventilated by a pipe ranging in size from one and a quarter to two inches in diameter, and the pipes which ventilate them are carried up above the highest fixtures, where they enter the soil-pipe. Similar wastes are provided in all the wash-basins and the sinks, and are made of four-pound lead, so shaped as to secure ready outflow. The very best material is used in everything. The soil-pipe is of cast-iron with securely packed lead joints. While the flush of the water-closets is automatic, that of the urinals is left entirely to the control of the janitor. The main drain connects with the street sewer without an intervening trap, but it is also connected with the huge smoke-stack of the building. The chimney thus becomes not only a ventilator for the drain, but for the street sewer as well. As the fires in the furnaces of this building are expected never to cease burning, the experiment may be as safe as it is certainly successful, while there is heat in the chimney. Horizontal pipes are laid in gutters, made of four-pound lead, which are readily accessible through the floors. The gas is supplied to the rooms on each floor, through separate meters, the meters for each room being arranged in the halls. The heating is done by steam, direct radiation, coils being placed in each room. The plumbing and gas-fitting were done by Messrs. Foskett & Brown.

HEATING AND VENTILATION OF THE FARREN SCHOOL.

This is a brick building three stories high, situated at the corner of Fifty-first street and Wabash avenue. It contains twelve rooms, and has accommodation for about seven hundred pupils, or sixty to each room. The day on which the building was visited, March 7, was not one of the coldest of the season, but a good winter day on which to make a satisfactory test of the working of the heating and ventilating apparatus. The wind was blowing moderately from the northeast, to which the building was clearly exposed. The thermometer on that day registered 18 degrees in the morning, and from 10 to 12 o'clock, the time occupied in the inspection, the thermometer indicated 23 degrees. A careful inspection was made of all the apparatus on every floor, and registrations were made of temperature and air-currents in all the rooms, by the use of thermometers and an anemometer, the result of which is shown in the illustrations given below.

Heat is supplied to the building by four ordinary furnaces in the basement, two on the south side and two on the north, each communicating with three rooms, one on each floor. The hot-air shafts and foul-air ventilating flues are all in the center of the building, an independent shaft for each room ; but they are placed near together, and the hot-air shafts impart sufficient heat to the others to induce upward currents in them. Further than this, the same shaft is made to serve the purposes both of conveying heat and foul air, as shown in Fig. 1, a closed brick partition dividing the shaft into two parts vertically. Heat is supplied both by direct and indirect radiation. For indirect heat, air taken from outside passes over air radiators and thence by flues to the floors. It is not discharged directly into the rooms, but between the floors and the ceiling below, to admit of which there is a special construction. The warm air is introduced to this space at the center of the room, and it is required to cross to the three opposite corners, where it is admitted to the rooms through registers. The movement of this air is indicated by a reference again to Fig. 1. After circulating through the room it is removed through the foul-air shaft, the opening into which is made at the floor. It is to be observed that none of the air which comes in contact with the furnace reaches the interior of the rooms, for respiration. Radiators (shown in Fig. 5), themselves kept at the desired temperature by a continuous current of air passing around and through the flues of the furnace, are placed in the fresh-air flues or ducts, imparting their heat to the incoming air, just as would be done were steam-coils used.

In Figs. 2, 3 and 4, diagrams are shown of each floor of this building, giving the location of the warm-air registers and the foul-air flue. The figures in the corners indicate the temperature of the incoming air at the registers (the thermometers were placed directly upon the registers);

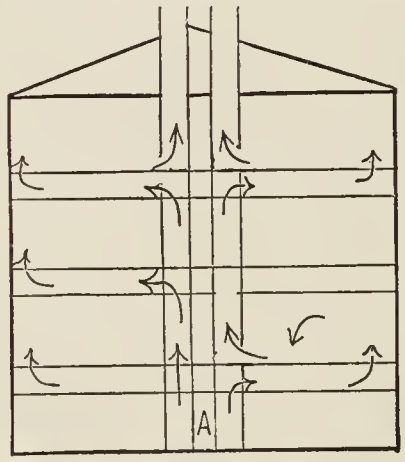


Fig. 1.

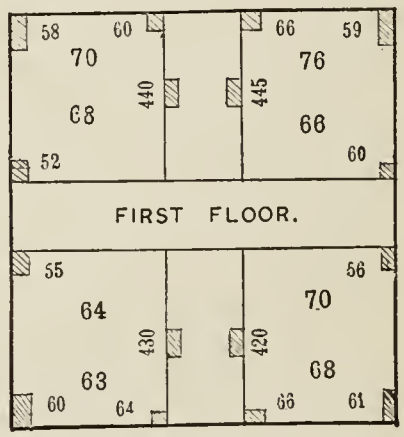


Fig. 2.

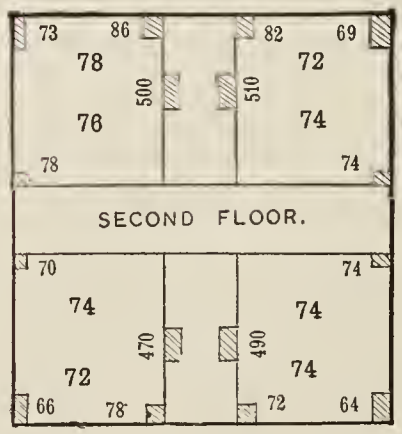


Fig. 3.

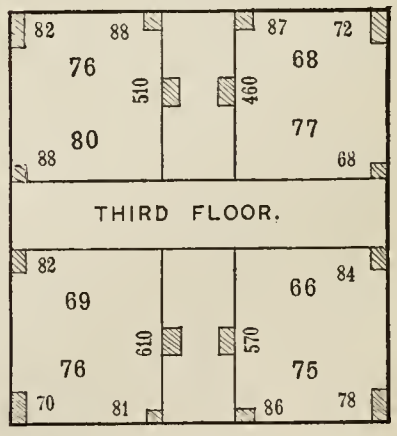


Fig. 4.

the large upper figures show the temperature of the room five and a half feet above the floor (this reading was taken from the thermometers hanging in the room, near the teacher's desk) ; the lower, larger figures show the temperature directly upon the floor, or rather of the floor itself, at the center of the room, and the figues near the inner wall indicate the velocity of the out-going air, per minute, through the foul-air register. The following summary brings the result into such shape that the actual condition of the temperature and foul air may be better understood. It should be stated that each of the foul-air flues was two feet square.

	First Story.	Second Story.	Third Story.
Average temperature of rooms	69	74½	70
" " floors	66	74	77
" " inlet	60	74	80½
Velocity of exhaust, per minute	434	493	537
Cubic feet exhausted, each room, per minute	1735	1970	2140
50 pupils, supply for each, per minute	35	40	43

Although the rooms have a seating capacity for sixty pupils, there was an average of about fifty in attendance on the day of the inspection. The smallest quantity of air supplied to each pupil, it will be seen, was thus two thousand one hundred cubic feet per hour on the first floor, and on the third floor each was getting two thousand five hundred and eighty cubic feet. The uniformity in temperature in the rooms was noticeable; also that the corners farthest from the hot-air flues were as warm as any part of the rooms. It was also noticeable that the temperature of the air, as it was discharged from the registers, was actually lower in some instances than that of the room itself. It was stated that a pupil never runs to the register to warm his feet or hands, nor to any particular part of the room, as it is never warmer in one part of the room than another, or at least the difference in the temperature is so slight that it cannot be detected. The air in the rooms was also quite free from any contamination, being as pure, apparently, as that outdoors.

Heat was partly supplied by an air radiator placed in each room, usually adjoining an outer hall. In principle, its construction and operation are similar to that of the steam-radiator and steam-pipes. Its operation, as found in this building, is shown in the diagram in Fig. 5. When heated, the air rushes through tight, insulated flues to the radiators and through the return flues, when cold, to the furnace to be reheated. The circulation is natural and there is little or no loss of heat.

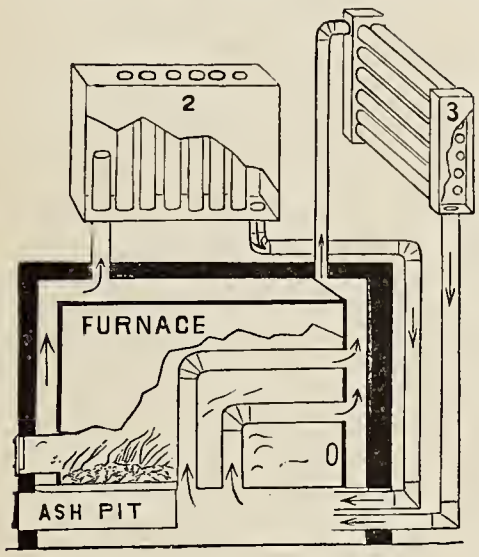


Fig. 5.—AIR RADIATOR.

The air delivered into these radiators is never discharged into the rooms for respiration. None of the radiators were found to be so warm that the hand could not be placed upon them with comfort, and the pupils were found sitting near them without any inconvenience. The flues are all provided with dampers, so that the supply of hot air can be easily regulated.

In conclusion, it may be stated that the heating and ventilation of this building were found to be quite satisfactory in every respect, except that a careless or ignorant janitor was allowing too much warm air to pass the upper floors, rather than so regulating the supply that all floors would receive a more equal distribution. The air radiators help to heat the rooms so that it is not necessary to introduce the excessively hot air at the registers, and yet sufficient air is introduced through them to serve the purpose of thorough ventilation. Furthermore, all the heat is well utilized, and in passing under the floors before it reaches the registers, the warm air keeps the floors as warm as any other portion of the room, whereas they are usually much colder in winter. The heating and ventilation were put in by Mr. B. R. Hawley, of this city, whose system is also found in other school buildings and some of the elegant houses in Chicago.

THE MANUFACTURE OF SANITARY APPLIANCES.—V.

SEWER PIPE.

In the manufacture of sewer-pipe it is of the utmost importance that the clay should be of a quality suitable for the purpose, and it must possess elastic, yet tenacious, properties. For different kinds of pipe, different clays and combinations of clays are used, that for traps and curves being of a better quality than that used in straight pipe. The clay is mixed and moistened in varying degrees, as experience determines, by being placed in a circular box and thoroughly pulverized and combined by means of rapidly-revolving travelers driven by steam or water power. The clay, when mixed, is placed on carriers and conveyed to a machine which prepares it in blocks of uniform size. These are placed on elevators and conveyed to an upper floor where they are fed into a steam press. This press is so arranged as to make socket, or ring, pipe. In case the socket pipe is being made, the press first forms the socket; when the clay is pressed solidly into the socket mould, it is forced through small holes in the bottom of the mould, and the workman in charge of the press then opens the socket-former and the pipe descends, which action forms the pipe portion of the joint. A truck is then wheeled under the platform on which the joint stands, and it is removed from the press; a light wooden rocker, of just the outside diameter of the pipe, is set up to it and the joint turned end for end, so that it may not stand on the socket. It is then placed in the drying-room to dry until dry enough to turn and cut and straighten, ready to go into the kiln. In ring pipe it is, of course, unnecessary to change ends, except to cut and straighten. Curves are made, oftenest, by being bent by hand as they are emerging from the press. There is also a press which, by having more clay supplied to one side than the other, produces a bent pipe. The press is similar in its action to the press for the manufacture of lead pipe. All traps, tees, and ys are made partly by hand. In making tees, a hole is cut in the freshly-made pipe the size of the inside diameter of the pipe to be joined to it, and the surface of the pipe around this hole is scarified. The short arm of the tee is, by means of a wire and an iron pattern, cut out to fit the curve of the long arm. The end of the short arm is then scarified and both scarifications moistened. The arms are united by slight pressure, and a small roll of clay is passed around the outside of the junction and moulded with the fingers to strengthen the joint. This is all done in, perhaps, two minutes. When the pipe is dry enough to admit of handling, it is placed in a kiln constructed of fire brick. The pipe is packed away as solidly as possible, the smaller sizes inside the larger. The kilns are so arranged that the fire, entering at both ends, passes to the top of the kiln and then down through and around the pipe and through the bottom. These kilns are called down-draught kilns and are quite expensive to build. The kilns are kept burning until the pipe is baked to a proper degree of hardness. The last thing to be done is to salt-glaze the pipe. This is accomplished by burning salt in the kiln-fires, by which a dense vapor is passed around and about the pipes in the kiln, glazing them perfectly. The secret of success in glazing is in knowing at what temperature to apply it. The kilns are allowed to cool thoroughly before being drawn.

As the methods of manufacturing sewer-pipe are practically the same in all factories, the process as practiced by the Akron Sewer Pipe Co., of Akron, O., is described.

UNWARRANTED ATTACK ON THE EFFICIENCY OF VACCINATION.

Mr. William Young, a leading member of the London anti-vaccination society, has had printed in some journal a diatribe entitled "failure of vaccination in Chicago," with a request at the top of the slip to "please reprint and circulate." THE SANITARY NEWS has not the space or the inclination to reprint or assist in the circulation of such a misconception of fact or wilful misconstruction of statistics as Mr. William Young has produced, accompanied with villification of the health department, because its head is a physician. But it is worth while for THE SANITARY NEWS to show how the facts presented by Mr. Young will *not* surely convince one of the mythical powers of vaccination. He shows how the mortality from small-pox in Chicago from 1851 to 1860 was but one hundred and nine; in 1861–1870, seven hundred and seventy-eight; in 1878–80, 1,479; in 1881, 1,180; and in 1882, 1,292. Mr. Young says, because of the fact that during the years 1880, 1881 and 1882, vaccination was well-nigh universal in Chicago, that vaccination was totally unprotective and that small-pox increased "at an alarming rate." In this paragraph he either does not know, or wilfully conceals his knowledge, of the fact that sixty per cent of all the immigrants coming to the United States, pass through Chicago. In New York they are closely confined in Castle Garden and packed into cars and sent west immediately. In Chicago they are unloaded, wander about the city and either make this city a home or a distributing point for the great west and northwest. It was among the immigrants that the majority of cases occurred, and it was by them that small-pox was first introduced into the city and continually dumped here until the immigrant-inspection service so regulated it that the cases were taken care of when they arrived here so wholesale exposure was not the rule. In regard to Mr. Young's statement that ninety-five per cent of the immigrants who come from Great Britain and Germany "had, doubtless, before landing on American soil, been branded with the mark of the beast," nothing could possibly fall so flat as this statement and the reason he gives for making it, that these mentioned are "the best vaccinated countries of Europe." It is generally believed that it is an exception when vaccination in infancy protects in adult life. All students are in accord on this subject. Now, what do *actual figures* (not mere conjectures) teach regarding the vaccination of immigrants "before landing on American soil"? They show that out of 11,159 immigrants examined at Port Huron, arriving in this country mostly by way of Montreal and mostly coming from Great Britain, but 1,910 (or but seventeen per cent instead of ninety-five per cent) were protected by vaccination within five years. Mr. Young then proceeds to find a cause for the small-pox epidemic in Chicago in the following words of Dr. De Wolf: "Such has been the addition to the population, that our tenement houses and cottages, and barn lofts, have filled with human beings far beyond any sanitary limit. If Chicago is to receive an accession of 50,000 souls yearly, packing them, as at present, in unsewered districts below the street level, on ground saturated with moisture and organic filth, the penalty will surely appear in some devastating epidemic." These words of Dr. De Wolf did not refer to a devastating epidemic of small-pox, because it had been almost entirely suppressed when they were written, but they referred more directly to diphtheria. No combination of heat and moisture and filth can produce small-pox, and in an epidemic of small-pox THE SANITARY NEWS would not advise its readers to rest with resort "to the sanitary engineer and scavenger," but also be vaccinated with pure bovine vaccine virus, Mr. Young to the contrary notwithstanding.

One of the most practical charities which is now being successfully developed in this city and one in which every housewife should feel a special interest, is the kitchen garden. It is to a knowledge of the household arts, what the kindergarten is to school education,—the first step, which may be easily and pleasantly taken by the youngest learners. The little girls are taught, by means of toys and varied exercises, the best uses of the ordinary household appliances, together with many practical lessons in housekeeping. It is hoped in many places where these classes are already started to supplement them, in time, with cooking classes, out of which may ultimately grow a training school for domestic servants. Many of these daughters of the poorer classes will find in this instruction, as they grow older, an incentive to greater care and neatness in their own homes, where inexperience and blunders often make life a struggle with poverty, and a continued drudgery, and those who become servants will enter upon their duties with an intelligence and skill which will place them far in advance of the average servant-girl of to-day. Whenever there shall be a class of trained domestics ready for service, the ignorant, the inefficient and the unfaithful will begin to lose their power. For this latter very large class the ladies who employ help are largely responsible. When a lady engages a girl as her husband engages a workman, demanding in return for wages a thorough knowledge of the duties the servant assumes, and a faithful performance of them, and when she follows failure or unwillingness by prompt dismissal, she will be less at the merey of "unskilled labor." Her distaste for household duties, and her consequent ignorance of many of their details, will not escape the notice of the most stupid girl, who thus feels that she has the indifferent mistress in her power, and is able to carry matters in the kitchen with a high hand. A woman who does not know how properly to direct a servant, or who will not rule firmly and considerately in her own house, either through fear or carelessness, deserves no better fate than she usually meets at the hands of the untrained and self-seeking "cook of the period."

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There desire to follow every whimsical change of fashion, and to keep pace with her "dear five hundred friends," in the matter of house-furnishing and adornment, often gets the better of the housewife's good sense, and leads her unawares, into a realm of ostentatious and inartistic sham. It crowds her parlor until it looks like a museum or a bric-a-brac shop, and appropriates the most incongruous articles to decorative uses. Art cannot exist in any form without directness, simplicity and harmony, and they are always in direct opposition to mere grotesqueness and lavish display. In many rooms pictures are hung without the slightest regard to suitability or artistic effect. Oil paintings, aquarelles and works in black and white are placed at hap hazard upon the same wall, the design of the owner being, seemingly, to show of how many such works of art she is the proud possessor. The crowding of many small pictures on the walls of one room is always in bad taste. It gives the effect of a studio or gallery and is disagreeably patchy. A few good pictures, especially if they are works in oil, carefully hung, can be enjoyed so that they seem like valued friends, and their familiar presence becomes more and more pleasant and restful. A recent writer pleads for a "calm, wide, wall-space" for pictures, and if it could be gained for the few worthy works by a removal of the many worthless pretensions, which, in the name of art, usurp the space in most houses, there would be an instant and rapid advance in honest pictorial art. In stately old houses, the family portraits are usually placed in the hall, or dining-room, if there is no picture gallery, but a row of serious faces in which one has only a misty interest is not in keeping with the cheerfulness which should pervade a dining-room. The modern idea of representing only fruits and game on the dining-room walls is equally inappropriate. It is not desirable to make the room simply the temple of a gourmand. A picture that calls up a pleasant thought, or suggests an animated conversation, is much more suitable. Aquarelles, etchings and engravings are appropriate for boudoir and bedchamber, and may be placed in the same room. A work that tells a sweet or a blithe story, a restful landscape, or a bright bit of flower-painting, are all delightful to open one's eyes upon in the morning waking.

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There are many people who find even one piece of the expensive and much prized cut-glass beyond their possession. The clear rose-cuttings, which flash back the light in rainbow colors, are at present very popular for table use and decoration, but few people can afford these costly crystals. Their beauty has been largely taken for granted, because they are expensive and fashionable, but there are many pieces for table use, which, in clearness, delicacy and beauty of form, far surpass the cut-glass articles, and are within the reach of a moderate purse. A well-known writer conveys much comfort to those who are denied this glittering luxury, and more than a grain of sound sense in the following words: "As the beauty of glass consists in its transparency and lightness, and its capability of being twisted, or blown, or moulded into a multitude of delicate forms, it easily occurred to the manufacturing mind that, if made thick and cut into solid facets, it would resemble crystal; and thus it has come to be a fixed idea that hard glitter is its most valuable quality, and so it is made inches thick and pounds heavy to enhance its brilliancy; and being one of the most fragile of substances, it must be engraved with crests and monograms, as if it were intended to carry down the name of the family for generations to come! Being of its nature transparent, it must be rendered opaque of set intention by coloring matter, and then painted and gilded! Since, at its strongest, glass can never be anything but fragile, at least let it keep the beauty belonging to fragility; since it is naturally transparent, let the light be seen streaming through it, sometimes delicately tinted, sometimes iridescent; and, instead of being cut, let it be blown and twisted into the thousand delicate shapes to which it easily lends itself, and of which, in the Venetian glass of a bygone day, and in its present revival, there are such delightful examples."

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Painted Swiss muslin is beautiful for cushion covers and the draperies of a toilet table. Many ladies who paint might turn their artistic abilities in this direction with charming results. The effect of the work on the thin delicate fabric is very pleasing. Nothing could be daintier than a dressing-table with Swiss draperies having sprays of wild roses, or cushion and mats, for a bureau with loosely tied bunches of poppies and corn flowers, or ferns and marguerites.

Martha Howe-Davidson.

CONTAMINATION OF WELLS.

No. 50 Finsbury Square, London, England, March 4, 1884.—(To the Editor):—I send you an original sketch of a case which came under my personal supervision as follows: A road-side inn, with well close to the building, depth about eighteen feet, water about six feet, seldom higher than seven. A few years ago a large additional room was erected over the said well, and the pump shifted to B in room A A. The workmen burst the crown or dome of well to get the pipe through, and never made the breach good. Consequently under the floor, as shown, there was always an opening. Now this country inn was infested with rats, and frequently the neighbors brought their ferrets to catch them. They were put under the floor but *seldom returned;* even *cats were lost.* Lately complaints being made about the water, the floor was taken up and there the defective dome plainly told what had happened. The top was removed, the water pumped out, and remains of animals taken away. We then discovered how the cats and ferrets never returned. Rushing along to catch the vermin they fell headlong into the well and there miserably perished. In every other respect this well was constructed to keep out the surface soakage, and was considered well-built. It is now sunk seven feet deeper, with York-stone top and every care taken to prevent a repetition of the above. Yours faithfully,

Henry Robert Allen.

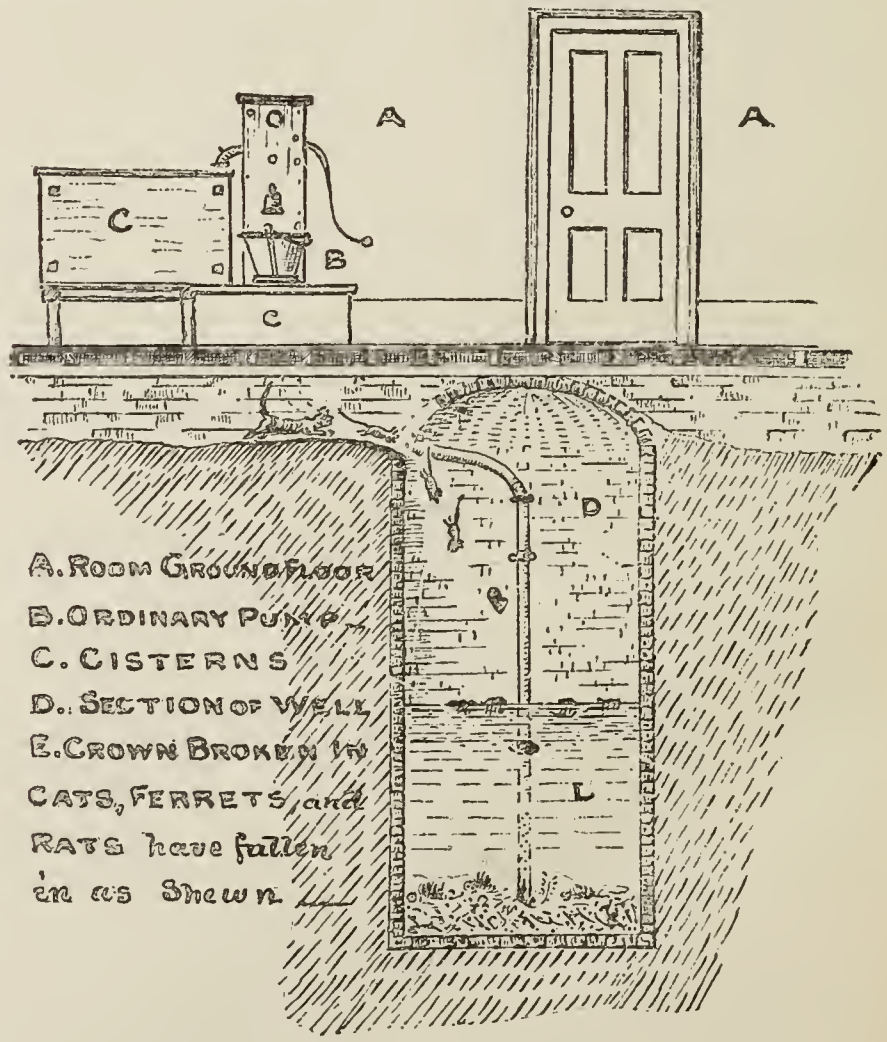


ILLUSTRATION SHOWING CONTAMINATION OF WELL.

The new water-works at Terrell, Texas, gave way and the cost of repair brings the total cost to $28,000.

CURRENT PUBLICATIONS.

BOARD OF HEALTH REPORTS.

New Jersey.—The report for 1883, the seventh, is received. It contains, besides a summary of the year's work, a paper, exhaustive in its character, on health in the home, by Dr. Ezra M. Hunt. This paper will be of more practical use to the citizens of New Jersey than all the rest of the report. There are other valuable papers, however, among which may be classed the report of Dr. William K. Newton, state milk inspector. Thirty-four pages are taken up with a register of physicians, which seems out of place in a sanitary report. Its usefulness is so limited that it does not seem necessary to combine it with the sanitary information. The report also contains statistical tables, from which it is found that the death-rate for the state for the year ending June 30, 1883, was 20.60 per one thousand of the population.

West Virginia.—The report of the state board of health for 1881, 1882 and 1883 combined, is received. It is an attractive volume of 305 pages, but lacks that useful adjunct, an index, hence its greatest usefulness to one unfamiliar with its arrangement is lost. The value of future reports could also be enhanced by placing running titles on each page showing the subject under treatment. The laws governing the sanitary administration of the state are first given. The proceedings at six meetings of the board follow. The succeeding sixty-one pages are given up to the regulation of the practice of medicine, a branch of the work which is not, by its nature, well suited to be distributed as sanitary information. The reports from local boards of health are given, but no general compilation is made. The remaining portion of this report is of real value to the people of the state for whom it was probably intended, because it contains information which may be used by them in lengthening their life by improving their surrounding conditions. Incidentally, the report is of use to sanitarians outside of West Virginia, although it need not necessarily be, in order to benefit the people of the state who are taxed to produce it.

Memphis, Tenn.—The fifth annual report of the taxing district of Shelby county is received. It is for the year 1883. The devastating epidemics of yellow fever in Memphis in 1878 and 1879, have made that city and its sanitary improvements so well known, that any sanitary report concerning them is of unusual interest. The estimated annual death-rate was 22.50. The recommendation is made that the river inspection service at President's Island be considered a part of the sanitary work of the city. It is urged for the third year that the water supply be abandoned. It is recommended that the bayou Gayoso be improved by filling its depressions and straightening its channel. It is recommended that the main sewer outlet should be extended to the Mississippi river, and the sewers be extended into the ninth ward. The sanitary work of Memphis, to be perfected, must include these recommendations. The expenses for the year were $24,775.84.

CO-OPERATIVE HOUSEKEEPING.

Mrs. Melusina Fay Pierce, in 1880, addressed the Illinois social science association upon the subject of co-operative housekeeping, and this book is an enlarged edition of the arguments then presented. The writer is most scathing in her denunciation of what she defines as the "woman fashion" of doing things, and laughs at the idea of one woman successfully and economically carrying on the trades of the baker, the washwoman and the seamstress. The mistakes and final failure of the Cambridge co-operative housekeeping association are depicted in a chapter entitled "how not to do it," and the writer follows with a chapter on "how to do it," in which she unfolds her own plan modeled somewhat upon the Rochdale system. Without passing upon the practicability of Mrs. Pierce's plan, the book is fascinating in its vigor, and full of earnest thought. It is published and for sale by James R. Osgood & Co., of Boston.

THE AIR WE BREATHE AND VENTILATION.—MOTT.

Henry A. Mott, Jr., has written, and John Wiley & Sons have published, the book with the above title. This book is written to describe, among others, the Cameron system of ventilation, which draws the air from the room by means of a hollow cornice, with orifices opening in the room and connected at one end with a pipe, up which a current of warm air is rising. Several other patented systems are described. The book is sold by S. A. Maxwell & Co., 134 and 136 Wabash avenue, Chicago, at one dollar.

HAND-BOOK OF SANITARY INFORMATION.

Dr. Tracy, in his duties as sanitary inspector in the New York Health Department, apparently, became tired of answering questions, and has compiled his information in a handy and handsome little book, which, it is hardly to be supposed, he presents to each questioner. To a householder who has a silent questioner within himself, who desires to learn something of sanitary affairs, this little book will prove very useful. The contents treat of air, drainage, disinfection, food and water, and in a fresh, practical manner. The salient points are brought out prominently by bold-faced type, which is a convenience, too, in referring to a special point. The book is copiously illustrated with drawings of sanitary appliances. The summary of the best methods of the disposal of sewage under certain conditions is especially good. The care of contagious diseases is set forth after the instructions of the national board of health, prepared by Profs. Chandler, Draper, Barker and Remsen, Drs. Vander Poel and Janeway. The adulteration of food and methods of detection are carefully treated. It is as practicable and useful a book of the kind as has ever been issued. It is sold in Chicago by Jansen, McClurg & Co., at 50 cents.

HEALTH AT HOME.

The Appletons deserve many thanks for the practical assistance they are giving the cause of public health by publishing so many good books bearing on the subject. The book bearing the above title is one of Appleton's home books, and is brought out in a beautiful embossed binding. As to the contents, they treat of home surroundings, privies and water-closets, the house itself, air, water, food, lighting and warming, disinfectants, bedrooms, clothing, personal habits, poisons and antidotes, accidents and emergencies. The matter is well written, important, suggestive, and desirable to bring before the people. If one lives in a city, perhaps the most convenient of the two would be Tracy's Handbook of Sanitary Information, but in this book the different subjects are more fully treated. There are no illustrations, but the book is beautifully printed. It is sold in Chicago by Jansen, McClurg & Co., at 60 cents.

PUBLICATIONS RECEIVED.

HOUSE DRAINAGE as Constructed by the Durham House Drainage Co., of New York. By William Paul Gerhard, Chief Eng. New York. 1884. Reprint from *Engineering News.* Pamp., pp. 44.

REPORT OF THE SECRETARY OF THE STATE BOARD OF HEALTH OF WEST VIRGINIA for the years ending Dec. 31, 1881, 1882 and 1883. Wheeling: 1884. Pam., pp. 305.

ANNUAL REPORT OF THE HEALTH DEPARTMENT of the city of Baltimore. 1883. Bd., pp. 151.

ANNUAL REPORT OF THE BOARD OF MANAGERS of the Maryland Hospital for the Insane, November, 1883. Pam., pp. 28.

SEVENTH ANNUAL REPORT OF THE BOARD OF HEALTH OF THE STATE OF NEW JERSEY, 1883. Woodbury, N. J.; James D. Carpenter, 1883. Pam., pp. 391.

SCHOOL AND HEALTH CIRCULARS. Nos. 2 and 3. New Jersey State Board of Health.

CO-OPERATIVE HOUSEKEEPING, How not to do it and How to do it. A study in Sociology. By Melusina Fay Pierce. Boston: James R. Osgood & Co. 1884. Bd., pp. 189.

FIFTH ANNUAL REPORT OF THE BOARD OF HEALTH of the Taxing District of Shelby County, (City of Memphis) for the year 1883. By G. P. Thornton, M. D., President. 1884. Pam., pp. 22.

HAND-BOOK OF SANITARY INFORMATION, Containing Facts and Suggestions about Ventilation, Drainage, Care of Contagious Diseases, Disinfection, Food, and Water. With Appendices on Disinfectants and Plumbers' Materials. By Roger S. Tracy, M. D., Sanitary Inspector of the New York City Health Department. New York: D. Appleton & Co. 1884. Chicago: Jansen, McClurg & Co. Bd., pp. 110.

HEALTH AT HOME. Appletons' Home Books. By A. Guernsey and Irenæus P. Davis. M. D., author of "Hygiene for Girls." New York: D. Appleton & Co. 1884. Chicago: Jansen, McClurg & Co. Bd., pp. 155.

NOTES AND NEWS.

ANNOUNCEMENTS.

April 17 and 18, at Hillsdale, Mich., sanitary convention, under the auspices of a local committee and State Board of Health.

August 21–27, at the Hague, fifth session International Congress of Hygiene, Dr. Overbeck de Meyer, secretary.

PERSONAL.

Dr. A. S. Maxwell, of Davenport, Ia., died at Los Angeles, Cal., last month.

A royal commission will inquire into the housing of the London poor.

Parke's museum of hygiene, London, is in danger of being closed for lack of funds.

The *National Republican* is attacking Dr. Smith Townshend, health officer of Washington, because a reporter was refused access to the books of the office.

Charles C. Brown, of Michigan university, more recently of the United States lake survey, has been appointed to the professorship of civil engineering in the Rose polytechnic institute at Terre Haute, Ind.

Surgeons Billings and Brown, of the United States army, are detailed to attend the international health exhibition at London.

Dr. L. P. Yandall, of Louisville, a physician and sanitarian of national reputation, died March 12 of neuralgia of the heart.

Dr. Alfred L. Carroll, of West New Brighton, has been elected secretary of the state board of health of New York, in place of Dr. Harris, deceased.

Dr. James F. Steuart, has been appointed as health commissioner of Baltimore, a position which he has before filled with ability. Dr. James F. McShane has been reappointed assistant health commissioner.

DISEASES.

Small-pox in Indianapolis has subsided. There have been ninety cases and eighteen deaths.

Scarlet fever in an unusually violent form killed four children in one family between March 10 and March 14, at Boone, Ia.

Mrs. A. H. Foote died March 21, at Lawrence, Kas., from blood poisoning, caused by a green veil which she wore coming in contact with a slight scratch on her face, the chemicals used in coloring being of an extremely poisonous nature.

A fatal case of glanders is reported from Elgin, Ill.

The death-rate for New Orleans for week ending March 15 was 32.88 per 1,000 population.

With foot and mouth disease in Kansas and glanders in Chicago, the subject of legislation against diseases of animals becomes an interesting one.

A number of people (290,545), nearly equal to one-half the present population of that city, died in Brooklyn, N. Y., from 1848 to 1883.

CONSTRUCTION NOTES.

The Adams express company will probably erect an office building in Chicago. Cal Wagner and Billy Burch are thinking of building a theatre here.

The contract for the Will county, Ill., court-house, after plans by Architect J. C. Cochran, of Chicago, has been awarded to Sauger & Moody for $132,000.

H. C. Koch & Co., of Milwaukee, are the architects of a new court-house for Dane county, Wis.

Architect F. O. Weary, of Akron, Ohio, has

prepared plans for a crazy house for the county infirmary.

The contract for the new main building for the Battle Creek sanitarium has been let to Bush & Patterson, of Kalamazoo, and is to be completed by October 1, 1884,

The contract for cleaning the streets in Chicago was awarded March 21 to Cooper & Walsh at $37 per mile. The provisions of the contract stipulate that 200 miles of streets are to be cleaned per month. The city is divided into five districts, there being 198½ miles of streets to clean. Some of the streets are cleaned two and three times a week, some once a week, and others twice and once a month. Last year it cost $70,000 to clean the streets. The amount asked for this year for cleaning and improving them is $180,000.

Sealed proposals are invited before April 2 for paving one hundred thousand square yards with white cedar blocks in Springfield, Ill.

Competitive plans for a public library building in Boston are invited, the premiums being $4,000, $3,000, $2,000 and $1,000 respectively. The plans are to be in before June 1.

CREMATION.

The prefect of the Paris police will authorize that all the human débris from the hospitals be burnt in a crematory, which is to be erected in a Paris cemetery.

Between February 6 and 13, Pere Hyacinth was led to investigate the subject of cremation, and in a letter written on the latter date says :

> You have in some way or other forced me to study the subject of cremation, or, to speak more correctly and at the same time more prudently, of incineration. I thank you, for I have been convinced that all my objections were based on mere prejudices. As for those which have a foundation, they appear to me unanswerable.

BOARDS OF HEALTH.

The expenses of the San Francisco health department for February was $1,751.

Dr. C. L. Van Pelt, health officer of Toledo, claims that Toledo is "the healthiest city of its size in the United States," the death-rate for 1883 being but 13.2 with a population of 62,000. The causes combining to produce this low death-rate were, "the absence of crowded tenement houses, the care taken in the ventilation of buildings, the excellent sanitary system, and the rigid enforcement of health ordinances by the health department, the hearty coöperation of citizens with the sanitary police to keep the city pure and clean, and an abundance of pure water. Added to this is the fact that Toledo has the best sewerage system of any city of its size in the United States, and being located at a good elevation above the lake, she is supplied with plenty of pure air."

The quarantine on the glandered horses in Chicago was on March 17 extended thirty days.

A Washington physician has had a suit at law commenced against him, in which the damages are laid at $1,000, for preventing, or failing to take the proper measures for preventing, the spread of a contagious disease in the family of the complainant. Quite right.

WATER-SUPPLY.

The Hygienic Council of Prague have decided to reject leaden water-pipes, as being injurious to health.

The work on the new water-works at Washington is progressing in a rapid manner, and the air pipe will soon be completed. There were five miles of this pipe to lay, being in three sections of 12, 10, and 6-inch measuse. The 12 and 10-inch pipe is now completed and workmen are now laying the 6-inch pipe.

Conroy & Sullivan, plumbers, of Newport, R. I., have just completed a water-supply for the United States fort near that city, called Fort Adams. The supply is derived from two artesian wells furnishing fifty thousand gallons a day. The pumping engine is located between the two wells and can pump from one or both. The water is forced one thousand feet with a rise of eighty feet to the storage tanks, from whence it is distributed to the post.

In Lake View, Ill., on March 17 bids for water-pipes were opened, and ranged from $33 to $35.70 per ton. The contract was awarded to Dennis Long & Co., of Cincinnati. An ordinance was passed for the laying of water-pipe connections and house drains in Fullerton avenue from Southport avenue to the river, and the clerk directed to notify the property-owners to have the work done on or before July 15.

The Hyde Park, Illinois, tunnel for the supply of the water-works of Hyde Park, after progressing some distance in the surveyed direction, struck a water and sand pocket through which it was impossible to pass. The course was then re-surveyed, and a deflection made. The work is now progressing finely, with a prospect of completion by June 1, 1884.

SEWERAGE.

The royal commission on the discharge of the sewage of London, has issued its first report. Like most commissions it has, so far, only collected a mass of historical material which has been known for years and published many times. The report does not make any recommendation for a remedy for the discharge of four hundred tons of solid matter, but it is evident that the most economical plan will be to extend the sewers directly to the sea.

The sewers of Memphis in 1882 consisted of 38.6 miles, and the cost in building new lines and maintaining the whole system was $11,503.-69. The removal of fifty obstructions cost $13.40 each, and cleaning cost $287.75. In 1883, there were forty miles of sewers, and the cost of maintenance was $12,049.67 ; the removal of seventy-three obstructions cost $10.72 each, and the cleaning cost $404.50.

Bids for sewer-work in San Francisco, Cal. :

Names.			
Daniel Harney.....	18th and Currero sts.	Sewer per foot.	6.75
J. W. McDonald.....			6.83
J. S. Autenalle & Co....			7.94
J. J. O'Connor.....		Manhole and cover.	$20
			30
			50
		Ironstone pipe. per foot.	2.15
			2.30
			1.90
		Corner complete.	$140
			150
			120
	18th and Dolores sts.	Sewer per foot.	7.10
			6.70
		Manhole and cover.	30
			30
		Corner complete.	$160
			150
	18th and Church sts.	Sewer per foot.	$7.00
			6.90
		Manhole and cover.	$30
			$0
		Corner complete	$165
			$160

SANITARY ASSOCIATION NEWS.

THE SANITARY COUNCIL OF THE MISSISSIPPI VALLEY.

At Memphis.—Memphis, Tenn., March 22, 1884.—(Special).—The annual meeting of the sanitary council of the Mississippi valley was held here on March 21. The following delegates and visitors were present :

C. W. Purdy, Chicago.
W. H. Donk, Martinsville, Ill.
E. A. Millioner, Springfield, Ill.
C. Y. F. Meriwether, Oakland, Miss.
G. W. Trimble, Grenada, Miss.
T. S. Elder, secretary New Orleans (La.) auxiliary sanitary association.
J. M. Hall, medical inspector, Chicago, Ill.
L. H. Montgomery, secretary Chicago medical society.
E. B. Montgomery, Quincy, Ill.
E. Garratt, medical inspector, Chicago, Ill.
B. M. Griffith, board of health, Springfield, Ill.
G. B. Thornton, president Memphis board of health.
Dr. J. H. Rauch, Chicago, Ill , secretary sanitary council Mississippi valley.
Dr. Starkweather, Chicago, Ill.
Dr. J. H. Lenow, Little Rock board of health.
J. A. Dibbrell, jr., Little Rock, secretary state board of health of Arkansas.
J. C. Hearne, secretary Missouri state board of health, Hannibal, Mo.
C. N. Hewitt, secretary state board of health, Minnesota.
Henry B. Baker, secretary state board of health, Lansing, Mich.
J. B. Lindsley, Nashville, Tenn., treasurer American public health association.
G. W. Overall Memphis.
Dr. C. C. Fite, secretary Tennessee state board of health, Nashville.
Dr. T. G. Birchett, mayor of Vicksburg.
Dr. L. F. Salomon, New Orleans medical and surgical association
E. H. Kimbrough, Danville, Ill.
D. P. Hadden, Memphis.
Dr. B. T. Buckley, Freeport, Ill.
Dr. D. W. Hand. state board of health, St. Paul, Minn.
Dr. W. E. Cowan, health officer, Galesburg, Ill.

The high estimation in which the council stands at the south may be inferred from the remarks made by D. P. Hadden, the mayor of Memphis. He said : "We know you come in the interest of sanitation generally. The city feels the greatest interest in all matters of sanitation, and every man, woman and child extends to you a hearty greeting. It is always a pleasure to us to have an organization of this character meet in our city. This association has no money to sustain it, yet its influence has been felt in every city in the valley. I know of no other organization which, without pay, meets together simply for such purposes, or that has the prestige this body has. We can truly say that no city in the union has derived so much benefit from it as Memphis. I might dilate for hours to show our appreciation, but it would be useless, as the newspapers have given you the facts from month to month and year to year. They have informed the public of the manner in which it has relieved us from sickness and distress, and from depression of spirits. They have told you of a city redeemed—one from which people no longer fly, but to which thousands have come and are coming."

The annual report was read by the secretary, Dr. Rauch, giving an account of the methods of inspection during the summer of 1883. I forward the summary of the work accomplished which had been begun by the national board of health and continued by the sanitary council, and the concluding remarks of the secretary :

> From May 15 to September 15, during which period the service was maintained, there were inspected seventy-three ocean vessels at the Mississippi river quarantine station ; 277 steamboats and other craft at the port of New Orleans ; 439 steamboats and other craft at the stations of Fort Adams, Miss., and Presidents Island, Tenn., and 1421 freight trains on the Illinois Central and Louisville railroads at New Orleans. The aggregate inspections comprise 2,210 ocean vessels, river craft and freight trains, with a capacity of 2,534,870 tons, and carrying 39,947 officers, crew and passengers.
>
> Not for many years has New Orleans been so free from alarm or cause of alarm, during the corresponding months, as during the sixty days ending August 31, last, and there was practically no trouble with regard to the yellow-fever during the summer in any portion of the region in which the sanitary council is directly interested.
>
> In conclusion, it seems proper to add that the utility of the council has been again demonstrated—this time in the direction of practical administration over a large area, embracing many and diverse interests, and co-ordinating and utilizing agencies and authorities which, otherwise, would have been limited in their usefulness to their own individual fields. The methods of instruction and sanitary supervision were uniform along thousands of miles of rail and river ; and all conflict of authority, all clashing of boards, and all expense and irritation of ill-advised and unnecessary quarantine, and hence, all embarrassment and interruption of travel and traffic were successfully and happily avoided.
>
> There is no question in my mind but that the form of the organization should be maintained in readiness for instant action whenever an emergency arises similra to that with which we were confronted during the summer of 1883.

The most important business of the afternoon was the report of the committee on resolutions, and the interesting action and debate had upon the report. The report was as follows :

WHEREAS, The supervising surgeon-general of the United States marine hospital service has opposed, and in a manner defeated, important measures for the promotion of public health interests in the United States, which have been advocated by our leading sanitarians and by this and other sanitary organizations in this country; and whereas, the representative of this marine hospital service in the national board of health has not contributed to the success of the important work of that board; therefore,

Resolved, That in any associated action which we may contemplate, either as executive sanitary officers or as voluntary associations, it behooves us to consider the marine hospital bureau as inimical to the public health interests, which it is our duty to protect, and as a danger which we should not disregard. For, although neither the chief of the service nor his subordinate officers are known in sanitary organizations like this, they are able so to place themselves before congress as to secure the ends they have in view.

Resolved, That as delegates representing the health organizations in the several states and municipalities hereinafter mentioned, and collectively, as the sanitary council of the Mississippi valley, we earnestly memorialize congress so to amend the act establishing the national board of health as to dispense with the representative in that board from the marine hospital service.

Resolved, That the sanitary council of the Mississippi valley recommend to congress the adoption of the bill introduced into the house of representatives January 8, 1884, by the Hon. Mr. Young, providing for the prevention of the introduction of infectious diseases into the United States, for obtaining information of the sanitary condition of foreign ports and places in the United States, and for procuring information relating to climatic and other conditions affecting public health.

The reading of the report called forth a good deal of lively discussion. Dr. Hewitt said three of the committee were not in favor of raising a question at this time which was calculated to provoke unnecessary discussion, and he did not approve of the majority report.

Dr. Baker, of Michigan, probably expressed the views of the majority of the committee, when he said he did not know of any good that had been accomplished by the marine member of the national board of health. He said: "I am opposed to any member of the marine service being placed on the national board. The methods of the two bodies are opposite, and I do not think they can ever harmonize. If we could have a national board from the people themselves that would aid states and societies, I would be in its favor. I do know that the marine hospital has made trouble in the past, and if they, the members from the army and navy corps, make it in the future, I would then be in favor of their removal also."

By a vote of eleven to eight the resolutions were laid on the table, nor could a subsequent motion to reconsider this action be carried.

President Hadden said that whether we condemned or sustained any national organization mattered not, but the council ought to hold on to all it could get. He thought it unwise to condemn congress. "We can ask," he said, "and if they do not comply we will then fall back upon our resources. We are no worse off than last year. Let us blaze out a road of action, so that in case of necessity we can go forward. The work last year gave security all over the valley. Whenever necessary, this city board will act again as it has in the past. If the marine hospital does not do the work that ought to be done we can do it. The local boards have the power. Give me the Mississippi with her $45,000, the state of Illinois and other states, and we will quarantine quick enough to make your head swim, without national aid. There will be no trouble about money. One case of fever in New Orleans will cause $500,000 to arise for our use.

Mr. Elder, of New Orleans, representing the auxiliary association, said the council was a safeguard to the whole country, and the only alternative was a disagreeable one—the shotgun policy. He had seen large sugar plantations ruined on account of it.

Dr. Thornton said he thought the council should give expression to their wish to sustain the friends of the national board in Washington. Yellow-fever and quarantine are not the only things to be attended to. The council should show its approbation of the course pursued by the members of congress who favor the national board.

Dr. Baker asked Mr. Elder to explain how he could speak against the shotgun policy and yet in favor of the marine hospital service, which had been using no other means of prevention except shotgun policy.

Finally, another resolution was offered and adopted, as follows:

Resolved, That the sanitary council of the Mississippi valley, in annual session assembled, memorialize congress to adopt the bill introduced into the house of representatives January 8, 1881, by the Hon. Casey Young, providing for the prevention and introduction of infectious diseases into the United States, and for obtaining information of the sanitary condition of foreign ports and places in the United States, and for procuring information relating to climate and other conditions affecting the public health.

After adopting a resolution of thanks to the railroads, hotels, citizens and the press, and after election of officers, the following resolution was adopted and the council adjourned, subject to the call of the executive committee:

Resolved, That the thanks of this council be, and the same are, hereby tendered to Dr. Rauch, the secretary of the council for his arduous and faithful labors, under the instructions of this council in 1883, and the executive committee are hereby instructed, if necessary, to adopt the same line of action in regard to the prevention of the introduction of yellow-fever or other infectious diseases into the Mississippi valley during the year 1881.

R. E. S.

STATE SANITARY CONVENTION.

At Seymour, Indiana, March 12 and 13, 1884.—The first session of the Indiana state sanitary convention was opened with Dr. Norbourne N. Shipman in the chair. Letters of regret were read from prominent sanitarians. Dr. Thad. M. Stevens, of Indianapolis, read a paper on the purposes of a state sanitary society. Legislation concerning the destruction of filth was treated by Rev. George L. Curtis, of Jeffersonville. His conclusion, drawn in part from the experiences during the recent flood, were suggestive of the effects of filth as a cause of disease. In the afternoon Hon. F. J. Van Voorhees, of Indianapolis, presented a paper on food and raiment, showing the necessity of proper food, well-prepared, and sufficient clothing, made on common sense principles. The proper ventilation of homes and public buildings was the subject of a paper by Dr. W. S. Haymond, of Indianapolis. A paper on chest pressure, by Prof. Thomas Harrison, of Brownstown, was read, illustrating the inevitable injuries following tight lacing. In the evening, Dr. Shipman read an address on the proper way to teach sanitation. Mrs. Virginia L. Oppenheimer read a paper on sanitary cooking. On Thursday, the second day, Dr. M. L. Boas, secretary of the county board of health, presented a sanitary survey of Jackson county, in which he was particularly severe on farming out medical attendance at the asylum. Dr. J. M. Moulder, of Kokomo, read a paper on the influence of tobacco and alcohol on the human race. Dr. E. S. Elder, secretary of the state board of health of Indiana, read a strong paper on the objects and uses of state and local boards of health. The importance of compulsory vaccination was argued by Dr. T. A. Graham, of Jeffersonville. Dr. J. W. Hervey, of Indianapolis, one of the veterans in sanitary work in Indiana, read a paper on the influence of habits and uses on the public health. A committee read resolutions on the death of Dr. L. P. Yandell, of Louisville, which were adopted. Dr. S. H. Chalton, after presenting a synopsis of his sanitary survey of Jackson county, was requested to complete it for the committee on publication. There was a large attendance at the closing session of the convention in the evening. A paper on nearsightedness in children was read by Dr. W. Cheatham, of Louisville, which was illustrated by several magic lantern views. A pleasant feature of the meetings was the free discussion of the papers presented. After votes of thanks, the convention adjourned.

BOARD OF HEALTH.

At New Orleans, La., March 13, 1884.—The Louisiana board of health met at the state house in the evening. Dr. Joseph Jones, president, read an outline of quarantine operations of the board during the years 1880 to 1883. The following table gives the number and class of vessels inspected at the Mississippi quarantine station during those years:

Year.	Steam-ships.	Sail-ships.	Barks.	Brigs.	Schrs.	Steam-tugs.	Total.
1880..	614	121	356	39	141	..	1,271
1881..	541	92	244	33	132	..	1,042
1882..	615	53	160	28	142	..	998
1883..	647	46	194	39	157	7	1,085
Total,	2,417	312	954	134	572	7	4,396

Not less than one hundred thousand seamen and passengers passed through this station. Yeiow fever prevailed at Vera Cruz, Havana, and Rio de Janeiro during this entire period, and four hundred and seventy-nine vessels from infected ports were detained at quarantine, yet New Orleans remained free from the scourge. From these facts, Dr. Jones concludes that (1) yellow fever is not indigenous to New Orleans; (2) yellow fever can be excluded from New Orleans and the Mississippi valley by a rigid and effective quarantine; (3) quarantine, to be effective, must embrace, not merely inspection and detention, but discharge of infected cargoes, thorough ventilation, fumigation and cleansing of ships. There was much other valuable information in Dr. Jones' report concerning smallpox in New Orleans. After the passage of some resolutions referring to the management of the board, it adjourned subject to call in case of some urgent necessity. This was probably the last meeting of the board, as the term of office expires.

MASTER PLUMBERS' ASSOCIATIONS.

At Chicago, March 19.—The second regular monthly meeting of the Chicago association was held on the evening of March 19. The name of Edward Hackett was read in the minutes of the preceding meeting as having been elected a member. His name was accidentally omitted from the list published in the last issue of THE SANITARY NEWS. The committee on library reported new contributions to the library fund, among which was a gift of $100 from J. B. Clow & Son, making a total of $174 already to the credit of the fund. Other committees reported progress, among these being the committee on new rooms. After the 1st of May the association will have its new quarters ready and fitted up for its use, at No. 125 Dearborn street. The committee on exhibition rooms reported that it had corresponded with eighty-one domestic and forty-four foreign manufacturers, and that most hearty responses had been received, showing not only a willingness, but an eagerness to place samples of their goods on exhibition in the rooms of the association. Letters were read by President Young, chairman of this committee, from a number of houses, indicating the feeling toward the association and its enterprise. Mr. Young prophesied that the association would have the finest exhibit in the world within three months. It was likely that the association would be hard pressed for room in which to make exhibit of all the articles that would be furnished. As an indication of the interest manifested, the L. Wolff Manufacturing Co., of this city, had offered to furnish whatever pipe and fittings the association might need in setting up the various articles, in addition to its own exhibit. A hearty vote of thanks was passed to all these people. Some discussion was had as to the means which could be taken to reject, or keep in the background, articles of little or no value, and it was finally decided that a committee should be appointed, having full authority to receive and reject articles that were contributed. The opinion was expressed that an attempt would undoubtedly be made to foist upon the association a great many appliances which every plumber knew had no practical value. It was not intended to lumber up the rooms with such stuff. The committee thus appointed consists of Messrs. Bowden, Boyd and Corboy.

A committee of three, consisting of Messrs. Murray, Ruh and Brown, was appointed to take charge of the library. This means that the committee is to receive the books contributed, keep a record of the names of donors, see to the construction of suitable cases for the books, arrange them, look after the loaning of books, keep a record of all money received and spent in this direction, etc.

Mr. A. W. Murray was called upon for an essay. No subject was announced, but he began the reading of a paper which alluded to the growth and prosperity of the association, and paid some pleasing compliments to the press in a general way. It soon appeared that this was only a prelude to a proceeding which had been wholly unannounced, but which was a pleasing recognition of the efforts which this journal has put forth in the interest of sanitary science, and especially in aiding the plumber to develop the science and improve the art of his trade. The editor of The Sanitary News was personally addressed by Mr. Murray, as follows:

Mr. G. P. Brown:—I am requested by the Chicago master plumbers' association to thank you for the many acts of kindness done us in the past; for the impartial and correct reports of the proceedings of our meetings in The Sanitary News, and for the aid you are giving sanitary science in moulding public opinion up to that standard which demands healthy homes, healthy food and healthy living. We believe in the saying that the press is mightier than the sword. We know that its sting of reproach, when directed by a biased mind, or an enemy, has given greater pain and produces more misery than the cut of a sword. But we are pleased to know that when wielded in the cause of reform and the welfare of mankind it is a factor for good. Judging you in the light of your conduct in the past, we prophesy for you and the journal you represent a bright future, and we hope the hand of man may never be raised to darken your prospects. Mr. Brown, allow me in behalf of this association to present you with a slight token of the respect and esteem in which you are held by us, and I feel for you and hope not in vain that the subject of this will be an open sesame to all meetings of the craft throughout the world.

Mr. Murray then proceeded to remove from a handsome morocco case a beautiful badge in gold, the design of which was the emblem of the association, "Hygeia," mounted on a six-pointed star, the whole suspended from a pen of gold. On the front was engraved, at the top, "The Press," and beneath the emblem "Hygeia." On the back was the date of the presentation with the name of the donor, the Chicago master plumbers' association, and that of the recipient. A similar token of respect was presented to Mr. W. H. Strong, representative of the daily *Inter Ocean* of this city, who has been a regular attendant at the meetings of the association, and whose journal has manifested much interest in the association.

On motion by Mr. Boyd the selection of delegates to the national convention, to be held in Baltimore in June next, was made a special order for the next meeting. The object of selecting delegates at this time is to give opportunity for the preparation of essays, which are to be read at that meeting, and to give such instructions as the association may desire.

Mr. John Dempsey was elected a member of the association.

Mr. Wade called attention to the fact that the inane jokes which many of the daily papers perpetrate on plumbers had the effect of keeping respectable young men and boys from learning the plumbers' trade. He hoped that this would soon end, and that plumbers would hereafter be made out of boys who were now in the public schools, and had a good education when they began their trade. An interesting letter was read from Mr. P. H. Murphy, secretary of the Milwaukee master plumbers' association, relating to progress and hindrances in that city.

At Cincinnati, O.—[To the Editor.]—At a meeting of the master plumbers' association of this city, held on March 11, the following officers were elected to serve the ensuing year: James Allison, president; John G. Murdock and Richard Murphy, vice-presidents; Thomas McNiel, recording secretary; James Semple, corresponding secretary; Thomas G. Neski, treasurer; Thomas I. Newman, sergeant-at-arms. This being our annual meeting, a large number of members were present; indeed, it may be said, the brains of the profession were out in full force. Great interest was manifested, and the best of good feeling prevailed. The ticket chosen is considered especially strong, and high hopes are entertained that with such officers the association this year will make a record worthy of emulation. It was the expressed desire of numerous members to push association matters with increased vigor. The craft here contains a fair average of good sound timber, but tacked on to it is a large amount of basswood (and rotten at that) that makes progress more tedious than it otherwise would be. How to get rid of this basswood, or in some way destroy its evil effects, is one of the problems the association must solve right speedily. The new committees will be announced next week. Respectfully,

James Semple,
Corresponding Sec'y. of M. P. A. of Cincinnati.

At Buffalo, March 19.—At the annual meeting held on the above date the following officers were elected: President, Edward L. Cook; vice-president, Louis P. Beyer; secretary, Charles Geiger; treasurer, Fred H. Yuhl; board of directors, Charles B. Huck, Jacob Davis, William Smith, Jacob Mersch and William Casper.

BUFFALO NOTES.

Buffalo, N. Y., March 22.—(Special).—Mr. James Scatcherd, of the board of water commissioners, has resigned, and Mr. George W. Miller has been appointed his successor.

The commissioner of public buildings reports that he has inspected police station No. 8, on William street, and found its sanitary condition very bad.

Messrs. Irlbacker & Davis have secured the contract for heating school No. 16, at $2,500.

Mr. Josiah Jewett is building a brown-stone residence on North street, near the circle, to cost $150,000; the architects are Warner & Brockett, of Rochester, and the contractor, Charles W. Berrick.

Mr. James B. Stafford will put up a four-story store at the corner of Church and Pearl streets, to cost $12,000; the architect is W. W. Carlin, and the contractor, C. W. Berrick.

Mr. John Bogart, secretary of the American society of civil engineers, is expected to be in Buffalo next week, to make arrangements for the annual meeting of the society to be held at Buffalo in June.

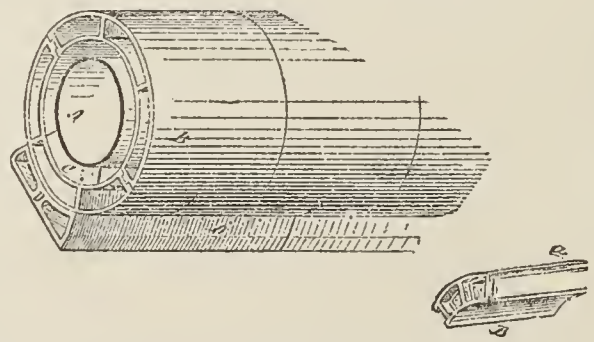
SANITARY APPLIANCES.

[*Under this head* The Sanitary News *will publish, in each issue, a complete record of all the latest patents of sanitary and building appliances issued at the United States patent office. Cuts will be reproduced of such as seem to have special merit. Single copies of printed specifications and drawings of any patent will be forwarded by* The Sanitary News *on receipt of twenty-five cents.*]

293,734. Water-Closet. Charles Harrison, New York City. Filed Sept. 1, 1883.

The combination with a nozzle or tubular portion of a water-closet bowl or hopper, having a flange at the outer end, and a pipe provided with a flange, of a coupling ring having arms, a band embracing the arms of the coupling-ring, and adapted to secure this coupling-ring to the nozzle or tubular portion of the water-closet bowl or hopper, another coupling-ring engaging with the flange of the pipe, and means whereby the coupling-ring may be united.

294,354. Conduit for Steam-Pipes. Leonard F. Beckwith, New York, N. Y., assignor to the Fire Proof Building Company, of New Jersey. Filed May 31, 1883.

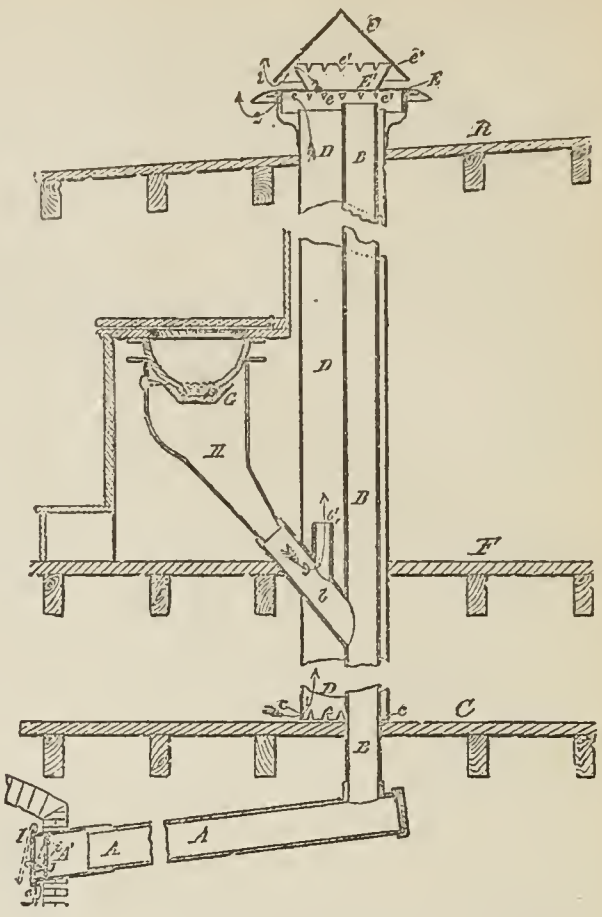


This is a casing for underground metal pipes for conveying steam, hot water, hot air, gas, smoke, etc. It is composed of separate hollow pieces, made of porous terra cotta, their surface covered with coal-tar, asphalt, silicate paint, glazing, or some other water-proof covering. In connection with this is an invert for drainage.

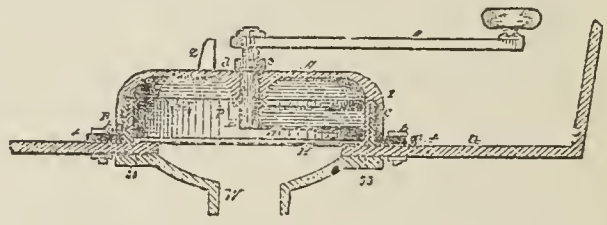
294,460. Combined Sofa and Bath-Tub. Gilbert E. Ga Nure Mount Kisco, N. Y., assignor of one-half to Asa Young, same place. Filed March 19, 1883.

294,503. Waste-Pipe Ventilator. Johannes Persson, New York, N. Y. Filed June 28, 1883.

The waste-pipe, or soil-pipe, as the case may be, is enclosed in a larger pipe, extending with the waste-pipe itself to and above the roof, where it is open to the air. It is also provided with holes at the bottom through which air may enter for circulation.



294,511. Sewer-Gas Check. Chas. Andrew Scheffler, Chicago, Ill., assignor to himself and Samuel H. Adams, same place. Filed April 17, 1883.



294,665. Roofing Composition. John F. Perry, Chicago, Ill. Filed April 4, 1883.

It consists essentially of soap-stone—35 per cent; slate, 20 per cent; and crude oil, 10 per cent.

294,674. Water and Steam Cock, or Faucet. Jos. Richter, Cincinnati, O. Filed Feb. 15, 1883.

294,697. Combined Gas and Electric Light Fixture. Luther Stieringer, New York, N. Y. Filed June 14, 1882.

294,758. Disinfectant. Chas. A. Catlin, Providence, R. I. Filed June 18, 1883.

A solid deodorizing ball, attached to a cord, is suspended in a water closet. Mr. Catlin has also patented a solid disinfecting compound composed of chloride of zinc and boracic acid.

294,771. Heating and Ventilating Drum for Stoves. John F. Davis, Altoona, Pa. Filed June 1, 1883.

294,776. Weather-Strip. Jeremiah R. Fogg, Salisbury, Mass. Filed Jan. 17, 1884.

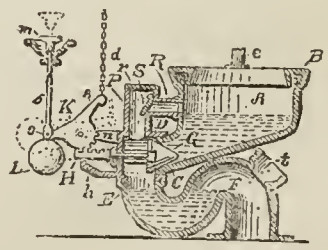
294,854. Steam-Radiator. Chester Comstock, New Canaan, Conn. Filed May 3, 1883.

294,855. Siding and Ceiling for Buildings. George W. Crawford, Davenport Center, N. Y. Filed Dec. 17, 1883.

294,982. Method of and Apparatus for Steam Heating. Mark S. Foote, Burlington, Iowa. Filed June 30, 1883.

294,992. Apparatus for Heating Water, etc., for Domestic and other Purposes. Watson A. Goodyear, New Haven, assignor of one half to Laudou Ketchum, Saugatuck, Conn. Filed Oct. 6, 1883.

295,010. Water-Closet. Stanton M. Howard, Wheeling, W. Va. Filed March 13, 1883.



The discharge-pipe has an upward extension, P, into which the horizontal overflow-pipe, R, discharges. The conical plug-valve, G, slides horizontally, operated by the lever pinion, K. The overflow is closed by the valve, S.

295,040. Steam-Radiator. D. F. Morgan and John Robb, Akron, O. Filed July 6, 1883.

295,061. Ventilator. Jacob G. Slater, Albany, N. Y., assignor of one-half to Nelson Fitch, same place. Filed Sept 28, 1883

295,120. Kitchen Cabinet. Ilram Hanna, Columbus, O. Filed May 28, 1883.

Current Topics.

The present issue of The Sanitary News contains the first of two articles of practical value on the "Scavenging of Towns," and the first of a series on "The District School-House," by a well-known, practical sanitarian, of Boston; this latter series will be fully illustrated. The unsanitary condition of another of Chicago's public school buildings is revealed. An outline of important legislation in Ontario with reference to plumbing and house-drainage is given. There are, also, valuable suggestions from correspondents; reports of sanitary engineering and building associations; book reviews, notes and news of a general nature, and a complete record of the latest sanitary and building appliances. The next in the series of articles on sanitary administration in foreign countries has been unavoidably delayed until the next issue.

The Chicago medical society has taken steps to secure a medical library. It is proposed to place all books purchased, or donated, in the rooms of the public library, so arranged as to make them readily accessible for reference. A committee has been appointed to solicit contributions, and this committee announces that all contributions of books and papers may be sent to the office of Dr. E. Andrews, at the corner of State and Randolph streets. Money, as well as books, is solicited, the suggestion being made that a few dollars from each physician would make an aggregate which could be devoted to a very useful purpose in the purchase of new books. It is also suggested that old editions of standard works be given, books of obscure authors, monographs and files of old journals.

What will probably be one of the largest suits to abate a nuisance, ever brought, has been begun in Toronto. The nuisance is caused by the excreta from about four thousand cows kept on distillery slops from a distillery in that city. This excreta is conducted through an open sluiceway into a confined, land-locked piece of water known as Ashbridge's bay. Dr. William Oldright, the chairman of the committee of the provincial board of health, on the disposal of sewage, has made a detailed report on the nuisance, and believes that people living in the east end of the city have good cause for complaint.

The city council of Newport, R. I., has accepted the sewerage plans of Mr. Bently, the city engineer, and work will be begun at once. By this plan, the sewers already constructed can be utilized. The sewage will be carried through the inner harbor, under the government breakwater, and emptied into the outer harbor.

It is reported that a skillful machinist, in one of Chicago's suburbs, has devised a new and apparently successful method of heating buildings by steam. A coil of pipe is placed in the bottom of a small stove, with which a similar pipe is connected as a supply-pipe from a small open tank of water. A gill of water, only, at once, is admitted into the coil in which the steam is generated, from which the steam passes into common two-inch heating-pipes in the rooms of the house. A new supply of steam is made to follow the rising steam as soon as wanted, by a simple arrangement of valves in the supply-pipe. Having gone the rounds of the heating-pipes, the steam returns through a condenser into the supply tank. The whole operation is said to be self-regulating. Among the advantages claimed for this invention are the following: No possibility of explosion; little or no care in management; small space and little water required,—two and one-half buckets lasting two months, day and night; can be attached with little change to common stoves, burning wood or coal; and a saving over common hot-air furnaces of more than sixty per cent. It is claimed that a house, in which there are two hundred and eighty-five feet of two-inch pipe, has been heated during the cold weather of the past winter with the use of two hods of coal only during twenty-four hours.

The opponents to the enforcement, by the Massachusetts state board of health, of the law to prevent the adulteration of food and drugs, have introduced an amending bill into the present legislature, by which they hope to destroy the efficiency of the present law. By those strange fatalities which affect state legislative bodies, the majority of the members of the committee on public health are men inimical to the best health interests of the state, and the bill referred to was drawn and is championed by the chairman of the health committee. He has succeeded in securing a majority report in favor of his bill, but it is a report from the "unsound majority." A minority of the committee reports a good bill as a substitute for the amending bill. There is a most vigorous warfare being conducted, and if the state board of health does not come off victorious, it may rest assured it has the cordial support of sanitarians in general.

There has been a very unpleasant quarrel before the committee on public health of the house of representatives, between the national board of health and Dr. John B. Hamilton, surgeon-general of the United States marine hospital service. It is unfortunate when branches of the government begin to quarrel, for, with charge and countercharge, many things will be brought out, even under prudent and honest administration, which had better remain covered up. The question for the committee to decide is, which side of this controversy is representing the public health interests of this country. Is it the marine hospital service? Most certainly not. Dr. Hamilton, while his ability is unquestioned, has never been in harmony with the American public health association, the sanitary council of the Mississippi valley, or the state boards of health. He has friends in all these bodies, to be sure, but they are in a decided minority. If the public health interests are not dear to the men who are most actively engaged in them all over the country, and if these men, in upholding the national board issue, are not sincere in their convictions, then they are really acting in a most unaccountable manner. There is one thing which the committee should have pointed out to them, that is, that it is not the personnel of the old national board or its operations that the sanitarians are defending. It is the belief that a national board of health will subserve the sanitary interests of the country and sanitary science in general, better than a one-man power, especially if that one man be the surgeon-general of the United States marine hospital service.

Unusual interest has been manifested in the international health exhibition to be held in England next month. Already application has been made by British exhibitors alone for space five times as great as that actually at the disposal of the executive council. Information has been received that the French government has appointed a commission, and it is expected that Italy will take a part. The first goods will be admitted on the 15th of this month. A portion of the educational section of the exhibition will be located in the central institute of the city of London, the handsome building in course of erection in the exhibition road, which has been placed at the disposal of the executive council. The royal Albert hall, with its musical attractions, will form an integral part of the exhibition; the aquarium, a popular feature of the late fishers' exhibition, will be continued as an important part of the health exhibition. In the dress section, the most popular exhibit, it is expected, will be a series which is being prepared illustrative of English dress of all ranks of life, from the time of the conquest to George IV. The international congress on education will be held at the same time, and conferences and lectures will aid in the elucidation of the subjects of the exhibition. It is also proposed to have a library and reading room in connection with the exhibition, which will be open to all visitors, in proper regulations, while the exhibition is open. The library will consist of books on various subjects comprised in the classification of the exhibition, both English and foreign. Application has been addressed to foreign and colonial governments, asking them for copies of reports and statistics on sanitary educational matters, and a circular is being sent out to authors and publishers requesting them to contribute works of a similar character.

The cremation society of England has received encouragement from a recent decision by Mr. Justice Stephen. The case before the court was one in which Dr. Price, a Welsh druid, was charged with unlawfully attempting to burn the body of his infant child, and with neglecting to give notice to the coroner of its death. The judge said that he was of opinion that a persons who burns, instead of buries, a dead body, does not commit a criminal act unless he does it in such a manner as to amount to public nuisance at public law. He did not consider it his place to offer any opinion on the comparative merits of burning and burying corpses, but, before he could hold that it was a misdemeanor to burn a dead body, it must be stated not only that some people object to the practice, but that it is on plain, undeniable grounds highly mischievous and grossly scandalous. There were, no doubt, religious considerations and feelings connected with the subject which every one would wish to treat with respect and tenderness. He supposed that it was a matter of historical fact that the disuse of burning bodies was due to the force of those sentiments. He did not think, however, that it could be said that every practice which startles or jars upon the religious sentiments of the majority of the population is for that reason a misdemeanor at common law. As for the public interest in the matter, burning, on the one hand, effectually prevents the body of the dead from poisoning the body of the living ; on the other hand, it might, no doubt, destroy the evidence of crime. But the great leading rule of criminal law was that nothing is a crime unless it is plainly forbidden by law ; therefore, this was a matter for the legislature. While he thought that to burn a dead body decently and inoffensively was lawful, or, at the very least, not criminal, it was obvious that if it was done in such a manner as to be offensive to others, it was a nuisance and one of an aggravated kind. The encouragement which the cremation society has received by this decision, has induced it to issue a circular, in which it feels it a duty to indicate the safeguards which it deems essential to associate with the proceeding in order to prevent the destruction of the body which may have met death by unfair means. This society purchased a site for its crematory in 1878, and erected a building with an apparatus of the most approved kind for effecting cremation. The society tested it by experiment, and found that it accomplished the purpose required without occasioning nuisances of any kind. Since that time the place has been maintained in perfect order, but has not been used, owing to a doubt, raised soon after the date referred to, as to the legality of adopting the process. It is probable that there will be no further delay in England in this direction.

Diphtheria, if not a filth disease, presents some cases and characteristics which strongly shake the faith of the germ theorists. For instance, in Hyde Park, Illinois, a house had connection with a cesspool in the rear yard ; two little boys in the family were playing ball over and around the cesspool. The ball was lost, as they thought, in the cesspool, and the boys, to recover it, pried up the cover and fished about in the contents of the cesspool, stirring up the mass considerably. Within six hours from that time, and within two hours of each other, these boys were attacked with unmistakable diphtheria and both died within a week. There was no diphtheria in Hyde Park, nor had there ever been any in the house. Another case was as follows: In the city of Chicago, Fullerton avenue forms the northern boundary of the city limits. This street has a sewer with a "dead" end. The first house having a connection with this sewer near the "dead" end, had within it four cases of diphtheria last winter. The examination by the health department revealed the fact that the waste-pipe from the refrigerator connected with the sewer directly and without a trap. There has been, during the winter, no case of diphtheria in any other house on Fullerton avenue. There is still another illustration: A gentleman living on West Adams street, this city, lost his little child with diphtheria.. The furnace was placed on the floor of the basement, under which was a sub-area about twenty inches deep. This sub-area the gentleman supposed was ventilated by holes through the foundation walls. In summer this had been the case, but the servant had closed them up. In the floor of the basement there were holes bored to supply air, supposed to be fresh, to the furnace. The soil-pipe, passing through the basement, led into the sub-area, where it was found to be ruptured, and discharging its contents on the ground, polluting the air breathed in by the furnace and supplied to the house. No diphtheria had ever been present in the house, and there was no other case in the neighborhood. To be sure, these cases do not positively exclude the diphtheritic germ as the causative agent, but the evidence is strongly circumstantial toward filth origin.

THE SCAVENGING OF TOWNS.—I.

BY JOHN YOUNG, INSPECTOR OF CLEANSING, GLASGOW.

Scavenging is not, generally speaking, a popular subject. It is, however, one of vital importance. It has unquestionably a most direct bearing upon the health and comfort of the inhabitants of towns and cities; and anything of which this can be said must be of interest. I do not profess to have much that is new to say on the subject; but simply a few observations from my experience in Glasgow. I shall, first of all, give a short sketch of the work of the cleansing department of this city, as at present carried on by the magistrates and council. It may be well to premise that the present population of Glasgow, upon an area of 6,034 acres, is estimated at 531,200; and the assessable value is £3,425,646. The general cleansing of the city, although under one management, is reckoned under three sections, viz.: (1) domestic scavenging, or night-soil and refuse removal; (2) street scavenging; and (3) the scavenging of private courts or back yards. Reversing this order I shall take:—

I. The Scavenging of the Private Courts.—In this branch of the work we have 218 men, including foremen, employed daily. Their working hours are from 4 in the morning till 9, and from half-past 10 till half-past 3. The city is divided into six districts, and these into eighteen sub-divisions. The sub-divisions are again divided into beats, and each man has his own beat to scavenge. All the closes or entries and courts, by or to which more than one tenant has right of access, are swept daily once, twice, or thrice, according to their requirements. Eighteen of the men are constantly employed scouring the dirtier courts and closes with hose, which they attach to the street fireplugs. The staff also includes public urinal-cleaners and ashpit limewashers. The total sum spent under this heading is, in round numbers, £10,000 a year. To meet the expenditure for cleansing private streets and courts, the Glasgow police act authorizes the levying of an assessment not exceeding one penny per pound upon all property bounding with or having right of access by or to any private street or court. I may mention here that all the scavenging under the two following heads is paid for out of the general police rates.

II. Street Scavenging.—The total lineal measurement of streets and roads within the city boundary is 153 miles. In this section 175 men are employed, including foremen; and we have sixteen horse-drawn sweeping-machines. The street scavengers are stationed under the same districts and sub-divisions, and work the same hours as the court scavengers. The horse-brushes are worked during the night, starting at 11 o'clock. For scavenging purposes we have first, second, third, and fourth-rate streets. All the first, or principal streets, are machine-swept every night, and the second and third less frequently, according to their requirements. The fourth-rate streets are, as a rule, those which are paved with rubble or undressed stones, and are swept by hand-brushes. The principal thoroughfares, which are swept every night by machines, are also picked, and the channels swept by hand-brushes during the day. Our latest improvement in this connection has been the introduction of a registered street-bin for the deposit of the droppings picked up from the principal streets. This bin is sunk flush with the foot pavement—the frame forming part of the curb—so that it is no obstruction whatever. It is chiefly on this account that I consider them so much preferable to pillar-bins, such as are used in London. The amount we expend upon street scavenging and watering (exclusive of the removal and disposal of the scavenge) is, in round numbers, £12,000 a year.

III. Domestic Refuse and Night-Soil Removal and Disposal.—(I may explain here that the carting and disposal of street scavenge is embraced in our accounts under this head.) In this section of the work 240 men, including foremen, are employed, and a stud of 175 horses, with the usual relative plant, which, in our case, includes 600 railway wagons for carrying the city refuse to the country. On the average for the year, 700 tons of manure and refuse are dealt with daily; and I may mention here that the cost of this section, deducting revenue from expenditure, is, in round numbers, £12,000 a year. In explaining our method of dealing with the city refuse, I shall first speak of its collection and afterwards of its disposal. In regard to the collection, I may say that we have tried several modes by way of experiment, but the two systems which may be said to be in operation in Glasgow, are the morning-cart or bell-cart system, and the ashbin or ashpit system. The former is in operation chiefly in the center of the city, where the properties are principally occupied as shops and warehouses. As a rule, fixed ashbins or ashpits have been abolished in the districts overtaken by the bell-cart. The great bulk of the domestic refuse of Glasgow, however, is collected from ashbins or ashpits. The most of these places of deposit are now small and improved in construction. As a general rule they are emptied once in eight days. In the denser parts of the city, however, many of them are emptied daily and others twice or thrice in the week, while in the less densely populated districts, especially where there are lanes running behind the properties, the intervals are much longer. The most part of the ashpit contents is removed by the staff working during the night between the hours of 11 p. m. and 9 a. m. Any portion removed during the day is taken from ashpits abutting with the lanes. As to the excrementitious matter, I may state that of late years water-closets have been largely adopted in dwelling-houses in all parts of the city, so much so that the larger portion of the excrement is disposed of by water carriage. We have, however 3,155 pail closets in use in connection with dwelling-houses, and 1,268 in connection with workshops, factories, etc. A large proportion of the pails are removed in covered vans, on the exchange-pail system, and we are extending this system of removal so far as practicable. Then, to tell the whole truth, we have still a remnant of the old system of privy and ashpit combined, but these will soon be abolished, and the sooner the better, as, laying aside the question of health, there is no means of emptying such middens without creating an intolerable nuisance.

The disposal of all the various classes of refuse collected in the city is the most serious task of the cleansing department. Scotch farmers, as a rule, prefer bulk manure when it is available, to chemical manures; that being so, we endeavor to place our city manure within the reach of as many of them as possible. The result is that we supply city manure to 2,400 farmers whose holdings are situated over four-

teen different counties. Until recent years our system of mixing and dispatching refuse was rather primitive. We have now, however, erected city refuse dispatch works at St. Rollox, in the northern district of the city, and other works of a similar kind are in course of erection on the south side of the river, good railway connection having been secured in each case. These works are thoroughly enclosed, and supplied with machinery and apparatus for dealing with the various kinds of refuse. The soil carts are taken to the upper floor, where the fæces are emptied into air-tight cast-iron tanks. The ordinary refuse is also taken to the upper floor, whence it passes down through a double-acting, revolving, screen. The finer ash passes, or is carried, into a mixing machine along with a mechanically regulated quantity of excreta. Some street sweepings, after being treated as I shall explain further on, are also simultaneously shot into the mixer, and thus a prepared manure—in a great measure deodorized and free from all hard rubbish—is passed mechanically into the railway wagons. The full wagons are at once dispatched to supply farmers' orders, or, failing them, to a yard twelve miles distant, where the manure is temporarily stored for the supply of future orders at such times as the daily supply falls short of the demand. Thus the necessity for storing refuse within the city is got rid of. The cinders taken from the domestic refuse are more than enough for raising the necessary steam for the works. [I may mention that the committee on cleansing have had before them for some time the question of utilizing the surplus cinder fuel in raising steam for electric lighting purposes, and at the present time a special joint committee has been appointed to report on the subject.] The rougher rubbish, which is delivered at the lower end of the revolving screen, falls upon an endless web, which travels at the rate of twenty-five feet per minute. Women are engaged picking from it, as it passes along, anything which can be utilized or sold. Garbage and dirty straw, for instance, go for manure; solder is extracted by a special furnace from the old meat tins; the tins, as they come from this furnace, as also old iron, old boots, etc., are sold. The remainder is delivered on the top of the cremating furnaces, through which it is passed, and the residuum, drawn therefrom in the condition of slag or clinkers, is used for road-making or filling up hollow ground. The foul air from the soil and mixing chambers is exhausted by means of a powerful fan, and conveyed under the bars of the cremating furnaces. It is thus purified before passing into the chimney, while, at the same time, it serves as a blast for the furnaces. Noxious odors are thus prevented escaping from the building. At the south side works special attention to this is being given. The exhauster will be still more powerful than the one at St. Rollox, and the pipes will be led under the furnace bars there also. But, in order to secure more thorough ventilation of the whole building, and also for light, we are forming a well, by leaving an aperture in each floor, thirty-one feet by twenty-two feet in the center of the three-story building, and a three-foot pipe will be led from the roof immediately above the well to the chimney. This stalk is 250 feet high, and is constructed with an inside chimney to the height of sixty feet, thus forming an annular chamber, about two feet wide, into which the ventilating pipe referred to will be led. Another new feature in these works will be a suite of baths, for the use of the employés in the works and also the street and court scavengers of the district.

This sketch would not be complete without further reference to our mode of dealing with the street sewerage. I need not say that it rains very frequently in Glasgow. One of the consequences of our uncertain climate is that a very large and ever-varying quantity of sweeping—often slushy—falls, to be removed from our streets. What we have aimed at is to make provision at our refuse despatch works for having all the street sweepings quickly disposed of along with the domestic and other refuse. For this purpose we have adopted a series of patent slush-tanks with sloping bottoms. In these tanks the water is rapidly forced to the surface by the downward pressure of the material upon the slope, and is drained off by means of the little side plates in the front of the tank. By this means, in the short space of twenty-four hours, soft slush from the paved streets is rendered solid enough to be despatched by rail along with the other manurial refuse. The sweepings of macadamized roads are drained in the same way. They are not, however, mixed with the saleable refuse, but are sent to Fulwood Moss farm, ten miles distant. This is a farm of about one hundred acres, which the magistrates and council, four years ago, leased for thirty-one years. At that time it was a heather bog, but it has now been thoroughly drained and reclaimed; and, with the application of road scrapings, yields good crops. A considerable part of the reclamation was done by the unemployed poor in the first months of 1879. Such are the general arrangements of our cleansing department. It is not to be supposed that I consider them perfect. All I can say is, we are endeavoring to advance with the times, and to meet the requirements which sanitary science, experience and common sense demand.

[To be Continued.]

THE DISTRICT SCHOOL-HOUSE.—I.

BY D. F. LINCOLN, M. D., BOSTON, MASS.

Introduction.—The purpose of this paper is to give some directions for planning and arranging small school buildings so as to promote the health of their inmates. Its chief aim is a practical one, the usefulness and comfort of the building, rather than the taste or elegance of its appearance, being taken for an object. Beauty is by no means unimportant, but can be discussed elsewhere and by others. In building country school-houses not much money is apt to be wasted on mere externals. But now and then a district possesses the means, and the disposition, to build "the best that money can get;" and it is hoped that some of the advice here offered may help such communities to present examples of model buildings.

A model, indeed, which shall be suited to all cases, is not to be thought of. That which suits a warm, sheltered climate, is ill adapted to bleak, hilly spots. Materials, popular in one place, may be disliked elsewhere, and with reason. Different plans of construction require different styles of building. If any universal model can be offered, it is that of the simple unit—the one-roomed school. And yet even this model is only a group of suggestions capable of various changes in every feature. Distinct plans, however, are given,

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and are explained sufficiently for practical purposes. It is not thought best to complicate the subject by describing large buildings. The type of country district schools is well marked, and the line between them and city schools is distinct. The purposes of such a building are simple, and yet there are a good many matters in the planning of it which are apt to escape attention, unless insisted upon by some person who is specially impressed with their importance.

For convenience, the paper is divided into three parts,—the first, describing some types of the district school-house as seen in our own state; the second, giving directions at some length, in a general way, for securing good sanitary results; and the third containing plans with descriptions.

I.—Visits to District School-Houses.—At the beginning of our study of the subject, it was thought best that a few school-houses of the average type should be visited. Accordingly, visits were paid to eight buildings in the eastern part of the state, in the month of August, 1883. This country abounds in hills and ridgy elevations composed of gravel and sand, and most of the school-houses stood upon rising ground of this sort. Some of the sites were bleak, but there was no other objection to be made to them. The schools are of the ordinary district type; and the number of scholars in each does not vary far from twenty. None of the schools were in session. Two were of brick, five of wood, and one occupies the lower room of a wooden town hall. Three are about fifty years old; the rest were built within the past fifteen years.

Nos. 1 and 2 seemed to be in good condition and repair. No. 3 is fully fifty years old, and ought to be replaced by a new house. The under-pinning is very shabby, the walls have cracked and settled, and bowed in several places, requiring wooden props; and some of the bricks are so soft that they can be crumbled between the fingers. The floors are much worn. No. 4 was like the preceding, and of about the same size. It has no cellar; the walls have bowed and settled badly; one window has been so twisted by the sinking as to leave spaces between sash and frame, above and below, through which I easily passed four fingers. The ceiling of Nos. 5 and 6 was falling off in large pieces. No. 8 was, in some respects, the worst off. It is an old wooden structure, at least forty years old. There is a porch at one side, with a part of the lathing ripped off. The main room is very low, and poorly lighted; the ceiling much broken, the stove cracked in several places, the stove-pipe useless, the desks very badly hacked and carved. The floor, however, deserves honorable mention, being made of good, sound oak, evidently laid down when the house was built, and is still in excellent condition, except where disfigured by the marks of chopping wood for fuel near the stove.

The last-mentioned house is the only one we entered that was strikingly deficient in light. Some of the others had windows badly placed—and this one is among the worst in that respect—but there seemed to be enough light in all the rest, while this seemed dark. By measurement of the amount of glass in the windows, it appeared that the ratio of glass to floor-space was only about one-twelfth. (Billings' requisition is that the windows shall contain one-seventh of the floor-area.) We will continue the subject by giving diagrams of the buildings.

It will be seen that the architects who planned these model temples of learning were guided by no particular principles. Nevertheless, there is evidence of progress, in some respects, from the older to the newer specimens. The oldest (3, 5, 8) are planned in disregard

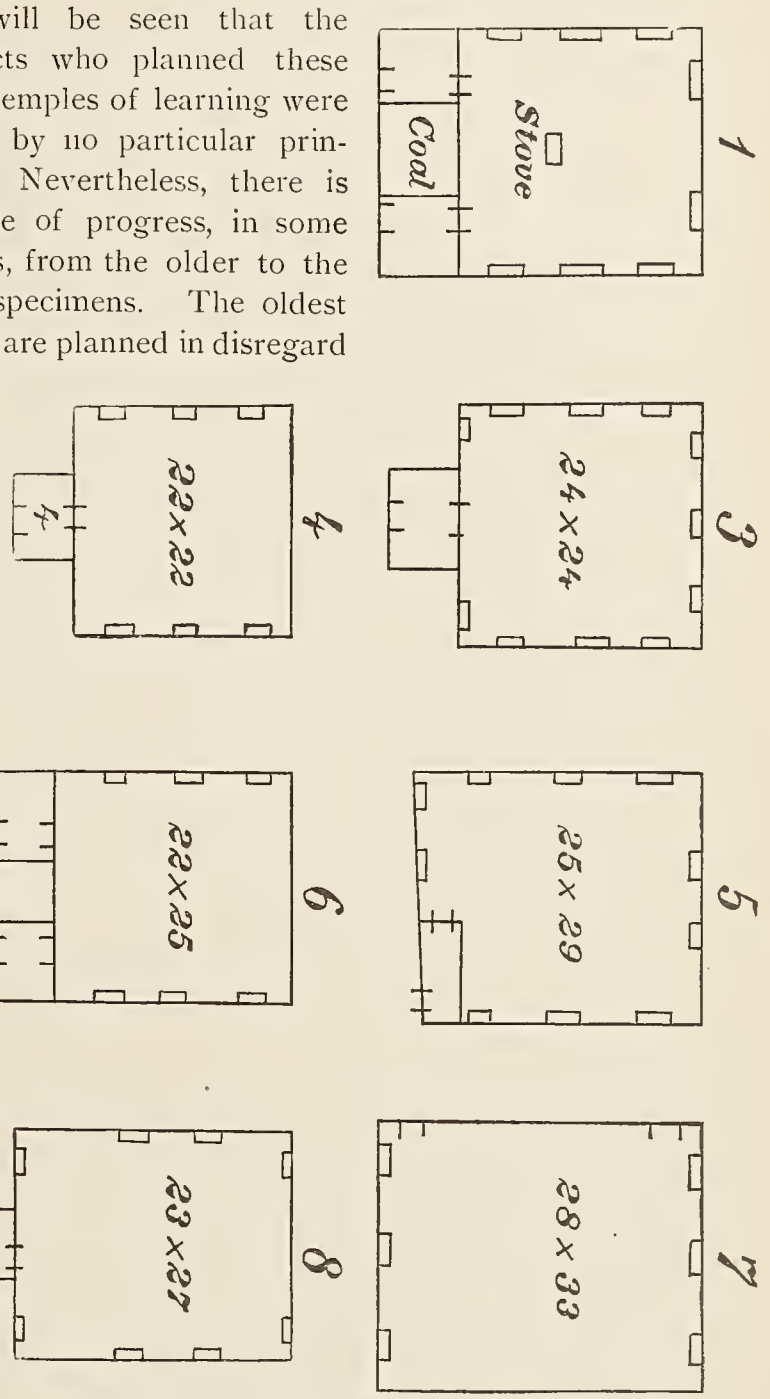


FIG. 1.—DIAGRAMS OF BUILDINGS.

of the primary rule,—"Never place windows in front of the scholars," while the newer buildings (1, 2, 6) have corrected this fault. No. 6, in particular, deserves mention as being well-lighted, having windows larger than usual, viz., 30x56 inches, measured on the glass, which is to the floor-surface nearly as one-eighth.

The only school-houses that possessed shades were No. 6, which had the simplest possible curtains of white cotton (not rolling, but tacked up at the top), and No. 2, with some remains of old curtains. The only shutters were green venetian upon one of the buildings.

All the schools are warmed by wood-burning stoves, placed near the middle of the room, usually within four feet or less of some desk, and in no case provided with a screen. There is no ventilation whatever, except what is obtained by opening windows; and this is done without inserting boards or guards to prevent the wind from striking the scholars. As a rule, the number that attend is not excessive, when compared with the cubic space; but no doubt there is a constant struggle between the demon of the black hole and old boreas for the mastery over these little, cracked, rattle-windowed, thin-walled rooms. In summer the windows are freely opened, but in winter the wind whistles freely through chinks in walls, around windows and doors, and through openings in the floor; so that the question of fresh air is often thrown

into the back-ground by the more pressing difficulty of keeping warm. One house was said to be "always too warm in winter;" this one (4) was furred and plastered. Of one (3) it was remarked that it had given our informant a headache every time he had visited it, or twelve times within the past three years.

In the ceiling of these buildings there are scuttles, leading to the garrets. Such openings are commonly supposed to act as ventilators; but they are not at all to be depended on for this purpose, and often let cold air down into the room. The rooms are nearly all too low-studded. The highest in the school-houses was nine feet seven inches. The one in the town hall, however, was high enough. No ceiling should be lower than ten feet; twelve is desirable; thirteen is the limit. In one school an effort has been made to supply fresh air to a stove by a duct leading under the floor, but the experiment seems to have failed. The capacity of the rooms was about as follows:

	FLOOR SPACE.	HEIGHT.	CUBIC CONTENTS.
No. 1,	535 sq. ft.	9 ft. 4 in.	4,949
No. 2,	" "		
No. 3,	576 "	9 ft. 7 in.	5,520
No. 4,	484 "		
No. 5,	791 "	8 ft. 2 in.	6,427
No. 6,	550 "	9 ft. 9 in.	5,562
No. 7,	924 "		
No. 8,	640 "	7 ft. 2 in.	4,586

The allowance of cubic space ought not to be less than two hundred cubic feet per scholar; and if the room is ten feet high (it should never be less) this will give twenty square feet of space for each occupant. Applying this test, we find that the largest room will accommodate nearly fifty; No. 5, about thirty-two; and the others from twenty-four to twenty-seven each. The condition of the schools is not, therefore, one of over-crowding, but might easily become such. Let me supplement these formal statements with three brief sketches (from memoranda furnished by the secretary of the board) of school-houses which, as we think, furnish fairly typical examples of large classes of our country schools.

On a gravelly knoll, almost bare of vegetation, stands a little red school-house, with twelve windows, which in summer time display some broken panes, but are mended for winter. The little porch in front was intended, perhaps, to furnish two entrances; but at present it is so divided as to give but one, the rest of the space being taken for a wood-closet. In the entry there is a shelf, and on it a water-pail, which has to make a pilgrimage of nearly half a mile to be filled. The school-room measures 23½x15¾ feet on the inside, and is 7½ feet high. The end by which we enter contains the door and one window; in a corner by the window stands the teacher's desk, and the rest of the width of the wall is occupied by a blackboard. The side walls are graced by a series of outline maps, some of them badly worn. A large box-stove stands in front, only three feet from the row of "recitation benches." Its pipe is carried overhead to the rear end, where a chimney, coming down to the level of the ceiling, receives it. The usual scuttle gives access to the garret. The number of scholars in winter often amounts to forty-six, though in summer it is rather smaller. They are seated in two rows of seats, five seats in a row, with desks in front; and there is also a bench set up against one side wall for the smallest ones. On each side there are four windows, in the rear three, and in front one,—none provided with blinds or curtains. Each window has seven rows of 5x9 glass, and the upper sash can be lowered seven inches. They are very loose. There is but one privy, which is near the road; the door is half broken from its hinges.

Obviously, here is little to be held up for imitation. If we seriously attempt to picture the scene in imagination, the result is somewhat as follows: There is a red hot stove right in front, with a row of scholars on seats which come within three feet of it. The hot pipe passes within two and a half feet of the heads of those behind. If we stand, we can almost touch the ceiling. If we sit, we are conscious of a torrid zone at the level of the head, a frigid zone at our feet, and an occasional small blizzard at other levels when a window is opened for momentary relief. The eyes are exposed to the glare of the sun and the snow. Accommodations are of the rudest sort in most respects. We need not call such a place "utterly unfit for human use;" there are much worse places; but we feel it a pity that it cannot be much better. In truth, the room contains only about one-fourth as much cubic space as it ought to contain, for the given number of children; it is defective in every dimension, especially in height; its atmosphere will begin to grow close within two minutes after the school opens; there is every provision for catching cold and getting headaches; and, beyond doubt, such a room is seriously dangerous to any person predisposed to consumption.

Still, something is done; windows are mended, for example. But the effort to remedy such a condition is idle. Most of such buildings are not worth the expenditure of much money. A temporary strain upon the resources of the district, for building a new house, is the plan which will pay best in the end.

Here is another type: The school-house stands in the center of a lot forty feet square, fenced on three sides by a high stone wall. The out-houses occupy the two further corners, and a screen runs from the school-house back to the wall, between them. The house itself has two doors, and the school-room is of twice the cubic capacity of the one just described. (Floor 30¼x17½, height 9 feet.) The windows are larger; there are five on each side, and three at the back. Water is obtained at a neighbor's, a few rods distant. All this is well. The arrangement of the seats is rather eccentric, however. In the front of the room a free space of ten feet is left. The remainder, comprising a space of about 17x20 feet, has four rows of seats, rising by successive steps one behind the other, with their backs toward the three walls, and facing the center of the space, where a stove is put. This arrangement, however well adapted for promoting sociability, has been planned in entire disregard of the requirements of good lighting. Most of the scholars, in fact, are placed with five windows right in front of them.

Let us take still another example. This time it shall be a fair specimen of the better class of village schools; an object of pride and care, an ornament to the landscape, and a model of the best ideas of its builders.

[To be Continued.]

PRACTICAL RESULTS IN BUILDING HOUSES FOR THE POOR.

Now that so much theoretical writing is being indulged in on the the subject of homes for the working-classes, a description of some practical work in that direction may prove interesting, especially if the account is prefaced by the statement that the practical effort has been a financial success.

The artisans, laborers and general dwellings' company (limited) was incorporated in England in 1867, the capital stock now being £1,250,000, and a premium of ten shillings is now attached to each share of £10. This company has built one estate of twelve hundred houses, one of twenty-two hundred houses, and is now working on one of twenty-six hundred houses. Each house is a cottage, and the tenant is independent of his neighbors, and free to follow his tastes or inclination in fitting up his house. There is a pleasing effort at architectural variety although in such cheap dwellings there is little opportunity for display. There are five classes of houses. In the first-class house there are four bedrooms, two parlors, a kitchen and scullery, and the weekly rental is nearly $3. The second-class house contains three bedrooms up-stairs, and a parlor, kitchen and bedroom on the ground floor, and rents at $2.50 a week. The third-class house contains a parlor, kitchen, wash-house, and three bedrooms, renting at $2.25 a week. In the fourth-class house the rooms are the same as in the third-class, with the exception of one less bedroom, and the rent is $1 87 a week. The fifth-class house is the same as the fourth-class, with smaller rooms, renting at $1.50 a week. The houses being built on suburban property, permit the cottage system, where in a city, flats only would prove profitable. Each house is built with every attention to sanitary detail. No sewer passes under a house ; a'l drains are properly trapped; sinks discharge over open-air trapped gullies ; ventilation of each room is accomplished ; each house is built on a layer of concrete the entire area of the house ; all walls are supplied with damp courses. There is a lively competition for vacant houses, and there are few vacant houses on any estate. The total rental is over £75,000, collected weekly.

THE SANITARY CONDITION OF THE HAVEN SCHOOL.

The Haven school is located on Wabash avenue, between Fourteenth and Fifteenth streets, and was erected in 1861. It has sixteen rooms, and accommodates between nine hundred and one thousand pupils. The heading of this article is not entirely appropriate, because the school may be said to have no sanitary condition whatever,— it is probably the worst building in Chicago, so far as this is concerned. There is a supposed provision for the entrance of fresh air into the rooms of the building, but it is of such a peculiar kind that it is worth noticing. The plan is this : In the ceiling of each hall there is a covered opening, which was to admit fresh air into the space between the two floors, conduct it thence through the space between the two walls of the rooms down to openings in the base-board underneath the platforms of the teachers. Whether this ever operated or not is entirely a matter of conjecture ; but from the nature of the plan and the laws of atmospheric movements, it is entirely improbable. The platforms have been changed in a number of instances since this plan was put in operation, so that the openings have been closed, and it certainly does not work now. On three floors of the building there is some provision for removing foul air. This is intended to be accomplished by an opening into a flue three feet by two feet in size extending from the basement to the outside air. Each flue has a steam-coil at the bottom. In the openings tested there was an appreciable outward movement into the flue. It will be seen that there is absolutely no provision for a fresh-air supply into the rooms of this building. The superintendent has devised a method by which air is introduced from the windows without very much draught upon pupils. He has introduced a sash, which is placed on the inside of the regular window sash and about two feet and a half high. The outside window can be opened and air permitted to enter by passing over this inside sash, without blowing directly upon the pupils. The fourth floor of the building is the most unsanitary of all. It has no method of removing foul air and no method of supplying fresh air, except by opening the windows. The rooms on this floor were after-considerations. The fourth floor, as originally constructed, was intended to be a gymnasium, or hall. The windows are located in the French roof, so that the bottoms of them are considerably above a person's head; they are properly dormer windows, and the light that is admitted is very small in quantity, and its distribution very unequal. These rooms are so dark, often, that it is impossible to write. Too much can not be said against the continuance of school in such a building as the Haven school. At the same time, THE SANITARY NEWS recognizes the magnitude of the problem with which the board of education of Chicago has to deal, when it attempts to supply educational privileges to the great number of school children in this city. Were all the buildings to be placed in proper sanitary condition immediately, the cost of such alterations would not only be enormous, but the school children in the meantime would have no place to go.

There are several plans for improving the Haven school; the most reasonable one is to tear down the building, and erect a modern structure on the ground. It has also been suggested that another lot be bought adjoining the present school property, and an addition be erected to the present school building. This plan, of course, requires a remodelling of the present building, using simply the walls, which are supposed to be valuable. There is not a single room in the whole building which is actually light enough. The building has not been calsomined in three years; the walls are black and dirty, dangerous from the liability of falling plaster, and altogether it is a building which can be unqualifiedly condemned. The privies of the building are simply abominable. The structure in which they are placed is of wood, and is nearly cut to pieces by the jack-knives of the boys. It covers an immense vault in the ground, in which the excreta has collected for years. It has no connection whatever with the sewer. The odor frequently reaches the school building and is very annoying. The janitor keeps them in as cleanly a condition as is possible.

ONTARIO SANITARY AND BUILDING LEGISLATION.

The legislative assembly of Ontario, before being prorogued, passed, on March 24, an act to make further provisions respecting the public health. The act is to be known as "the public health act of 1884." Its preliminary section defines the terms employed in the act. The third section provides that the provincial board of health may issue regulations to prevent the spread of disease, to secure sanitary conditions, and to establish quarantine, the local board of health being charged with the enforcement of the regulations. The board is authorized to conduct investigations into the causes of disease. A local board of health is provided for in each township, village and city. Two or more localities may unite their municipalities into a health district. The local health boards, or district boards, appoint their medical officers of health. Any costs recoverable from an owner, in abating nuisances, may be recovered from the occupier and deducted from the rent. The local board of health is to make inspection for nuisances and order their abatement. Offensive trades may not be established without the consent of the municipal council. Plans relating to proposed systems of water-supply or sewerage must be submitted to the provincial board of health, and no sewer or appliance for their ventilation shall be constructed in violation of any principles laid down by it. Health officers and sanitary inspectors have power to inspect meat and other articles of food. Householders and physicians must report cases of small-pox, diphtheria, scarlet fever, cholera or typhoid fever within twenty-four hours. The following regulations are, by the act, made parts of a by-law in force until altered by the municipal council:

1.—No house shall be built in or upon any site, the soil of which has been made up of any refuse, unless such soil shall have been removed from such site, and the site disinfected, or unless the said soil shall have been covered with a layer of charcoal, covered by a layer of concrete at least six inches thick and of such additional thickness as may be requisite under the circumstances to prevent the escape of gases into such proposed house.

2.—The drain of every house, which may be connected with a sewer or cesspool, shall be ventilated by means of a pipe extending upward from the highest point of the main soil or waste-pipe, and also by a pipe carried upward from the drain outside the walls of the house. These pipes shall be of the same dimensions as the said main soil or waste-pipe, and shall be constructed of the same material, or of stout galvanized iron, and no trap shall intervene between the said ventilating pipes. In case a trap shall intervene between the sewer or cesspool, and the ventilating pipes already described, then a four-inch ventilating pipe of the same material as above described shall be carried from a point between such trap and the sewer. All such ventilating pipes shall be carried above the roof of the said house, and shall open above at points sufficiently remote

from every window, door, skylight, chimney or other opening leading into any house.

No pipe carrying air or gas from any drain or soil pipe shall be connected with any chimney in a dwelling-house, unless the same be a furnace chimney used exclusively for the purpose of ventilating such soil-pipe or drain.

3.—Every house-drain shall be constructed of vitrified earthenware or iron pipe; and every soil and waste-pipe, of iron pipe rendered impervious to gas or liquids, the joints thereof being run with lead and caulked, or of lead pipe weighing at least six pounds to the square foot; and the waste-pipe from every closet, sink, tub, wash-basin, safe or other service shall have as near as may be to the point of junction with such service a trap so constructed, vented and furnished, that it shall at no time allow of the passage of gas into such house. All joints shall be so constructed as to prevent gas escaping through them.

4.—The construction of any closet or other convenience which shall allow of the escape into the house of air or gas which has been confined in any part of it or from the drain or soil-pipe, is hereby prohibited.

5.—No refrigerator-waste shall be allowed to connect with any drain.

6.—No pipe supplying water directly to a water-closet or urinal shall be connected with the pipe supplying water for drinking purposes.

16.—Every person who erects, or causes to be erected, any building shall, within two weeks of the completion thereof, deposit in the registry office of the registry division in which the building is situated, plans of the drainage and plumbing of the same as executed; and in the case of any alteration of any such plumbing or drainage, it shall be the duty of the owner of the house, within two weeks of the making of the alteration, to deposit in the same manner the plan and record of any such alteration; if such alteration is made by a tenant, it shall be the duty of the tenant or lessee to deposit or cause to be deposited the plan and record of such alteration.

PROPOSED EXCESSIVE LEGISLATION FOR THE INSPECTION OF DWELLING-HOUSES.

A bill has been introduced in the house of commons to provide for the "better" inspection of dwelling-houses in England. It commences by reciting that a large number of diseases arise from imperfect sanitary fittings, faulty house-drains, inefficient ventilation, and contaminated water-supply, and that it is expedient to provide for a more thorough supervision of all buildings during construction, as well as for a periodical inspection of all buildings when occupied. It is proposed to authorise every local authority to appoint sanitary inspectors to carry out the act. These inspectors are to examine the plans of all buildings to be erected, and no building shall be commenced after the passing of the act until the plans for such buildings have been approved by the inspector.

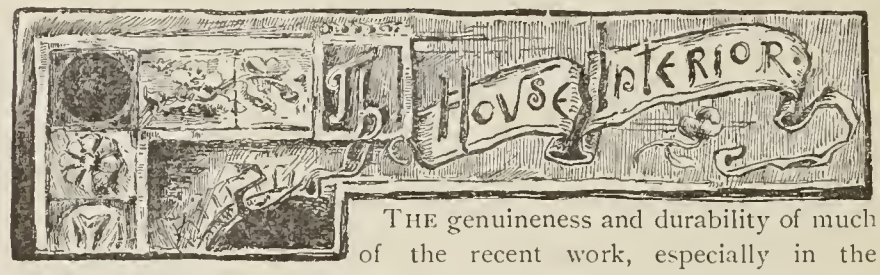
The sanitary inspectors shall be guided by the following rules in the examination of the plans and descriptions of all new buildings submitted to them, namely, that the foundation of the buildings shall be dry, and a damp-course provided; that the drains be of adequate size, laid with a proper fall, disconnected by a ventilating man-hole or trap from the main sewer, and have their connections properly made; that there be no direct communication between the drains and the interior of the house; that the soil-pipes be efficiently ventilated and brought down outside the building, without any outlet in proximity to any outlet in such building; that the closets or privies and refuse-receptacles are in proper situations, well-ventilated, of proper construction, and adapted to any scavenging arrangements that may be in force in the district; that all waste-pipes from sinks, basins, cisterns, and baths, discharge in the open air, near but not directly over gullies outside the house; that all cisterns for the storage of water be properly constructed to prevent any fouling of the water, and be conveniently placed for examination and cleaning; that adequate openings from the external air be provided into all rooms and below the joists of the ground-floor for ventilation.

The sanitary inspectors are to be empowered to survey buildings from time to time during the course of erection, and on the completion of buildings shall test all the drains, soil-pipes, and sanitary fittings, and upon being satisfied therewith shall grant a certificate to that effect, and it shall not be lawful for any building to be occupied or used without such certificate having been granted.

In addition to these duties, the sanitary inspector and his assistants are, at least once a year, after the passing of the act, to make an inspection of the sanitary fittings, drains, water-closets, earth-closets, etc., means of ventilation, water-supply and storage, and all other sanitary appliances and things of all buildings existing in their district after giving forty-eight hours' written notice to the occupier and owner of such building. In the event of any defects being found to exist, the owner or occupier is to be required to remedy them within a reasonable time, and in the event of non-compliance, the local authority may, if it thinks fit, execute the necessary works, and recover the costs from the owner in a summary manner.

The expenses of the inspectors, as well as the expenses of any alterations required to be made to place buildings of every description in a proper sanitary condition, including the expense of opening the drains and pipes for inspection, are to be paid by the owners of the property.

The Builder, from which this information is obtained, very properly concludes that if this bill should become a law, it would seriously affect the interests, comforts, and conveniences of every class, and would place a new and apparently unlimited power in the hands of officials. It also states that there can be but little doubt that the law that regards building in the metropolis requires some further amendment; but the question is a large one and cannot be properly dealt with by a private bill. There are some excellent points in this bill, as will be seen, and it is evidently a step in the right direction toward arousing the public to a sense of the necessity of a better supervision of the construction and inspection of dwelling-houses; but it is going too far to require an inspection, in so irresponsible a way of every building once a year, at the owner's expense.



The genuineness and durability of much of the recent work, especially in the finer qualities, which has come from the hands of manufacturers of wall paper, draperies and upholstery fabrics, has created a feeling of permanency which is not disturbed by new spring manufactures. Honest textures, good colorings and consistent designs give no excuse for a change with every season, and, when each article in a room is a necessary element in the general harmonious effect, its possessor is not likely to become quickly weary of it. There is little change in wall-hangings this season. Last year's popular colors remain in favor, although they appear in lighter tones. The richer qualities of French papers show a return to unconventionalized floral forms in natural colorings. Lincrusta-Walton is used with excellent effect, its relief design taking the various metallic tints admirably. Stenciled and tapestry designs are in favor for halls, and chintz papers, with delicate floral patterns on a surface of fine gold network, are much used for chambers. At the store of Spoor Mackey are some new wall papers, which are quite novel in effect. A rich flock paper has a design also in flock, with blending tones and varied iridescent metallic colorings. One of these shows a canary background with a French conventional design in two darker shades, brightened with the iridescent glitter in five different tints, the whole being harmoniously combined. Another cinnamon-brown flock has a flowing design in gold iridescence, with touches of wine-color. The velvety background, and the raised decoration give almost the effect of an embroidered fabric. Some laquered pressed papers, which resemble embossed leather, are intended for dining-room uses, showing fruit in natural colors. A bold floral design in slight relief is set against a latticed background of pale gold, in exquisite tints of terra cotta, citron and silver gray. A similar paper, unlacquered, has a highly embossed decoration in detached flowers of vello green, fire gilt and old gold against a surface of silver basket work. Some excellent East India designs by De Forest, having carved and jewel-like effects, are shown, which are very clear and brilliant. Tapestry and French and Italian renaissance designs are found in all grades of wall-paper and the metallic colorings appear in great variety of tint, and are combined with all the favorite colors. Picture mouldings are found in equal variety, showing gold inlays with the various woods, as well as Roman, flame, steel and Etruscan colorings.

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The majority of people are still loth to believe that any floor-covering, except a heavy tapestry or Brussels carpet, tacked close up to the base boards, is suitable or fashionable, the latter word often embodying the weightiest consideration, and the women who have the least and most uncertain assistance in their domestic work are the ones who cling most tenaciously to the old traditions. Many of these women are prominent workers in missionary and charity organizations and believe in reform,

but in the cause of health and comfort in the household they are either ignorant through carelessness, or indifferent through lack of independence, or a blind allegiance to so-called fashion. In many households the spring cleaning will offer an excuse for the removal of one dust-trap in the form of a wool carpet, and the purchase of another equally unsuitable and inconvenient. Floors can be relaid in hard wood with little more expense than a good carpet involves, or if that is inexpedient, straw mattings are moderate in cost and easily available. The popular idea that a straw matting is necessarily cheap in appearance and unserviceable is a mistaken one. The seamless mattings in the lama and amaryllis brands are firm and closely-woven without the frequent joinings which so soon become worn, and thin places in the common mattings. These seamless mattings, if well laid, are as smooth and even as a wood floor, and can be easily kept clean by being washed in clear cold water every week. For dining-room floors the Kensington art squares are desirable. They are found in the best grade of ingrain, in excellent colorings, and are light enough to be easily removed and shaken. The new carpets, like the wall-papers, show little change in color, the dull shades of last year brightened with stronger touches, and reproductions of antiques and Oriental effects being the most popular.

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Now that furnace and stove fires are becoming oppressive, the question of open grates, which has been so often discussed in this column, comes up once more for consideration. A house should never be left, in this latitude, without some ready and convenient means for heating in summer. For this purpose, and as a help to good ventilation in winter, the open grate is better than any other means. Much attention has been given to this subject during the last year or two, and the result is seen in various improvements in the arrangement for an open fire. Among them, the E. A. Jackson heat-saving and ventilating fireplace is efficient and practical. The supply of fresh air for the room being obtained from outside by means of a flue entering at the bottom and back of the grate, this fresh air when heated passes into the room through an openwork frieze at the top of the fireplace. In this way the atmosphere of the room is kept warm and pure without the constant drafts which the ordinary grate produces. Great economy in heat is claimed for this grate. The warm air flue is sometimes also extended to the room above, the heat entering through an ordinary register.

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The new rooms of the Woman's club, which have recently been fitted up, show some delightful color effects in their decoration. Terra cotta and blue are the colors employed, two tints which require very careful handling to be pleasing in combination. The walls are plain terra cotta, the frieze and style of the ceiling a delicate plain blue, and the field of the ceiling shows a lighter shade of blue with an indefinite circular design in gold. The carpet is in two tones of blue, soft in color and unobtrusive in design, the platform carpet being terra cotta in a similar pattern. The door, window and cabinet hangings are of soft terra cotta silk with a flowing vine pattern in a darker shade. Mahogany chairs with dark leather upholstery, little tables and rattan chairs are scattered about the room, the whole effect of which is pleasantly bright, harmonious and cheery.

Martha Howe-Davidson.

SEWERAGE OF MANSFIELD, OHIO

The city of Mansfield, O., has decided to levy a tax of $22,000, for the construction of a system of sewerage. Mansfield is a city of about 12,000 inhabitants,—a growing manufacturing and railroad center. It is located on a sandstone hill, with a declivity sufficient, it is claimed, for ample surface drainage. There are no streams into which to discharge the sewage, or by which to flush the sewers, except two small creeks, which are liable to be dry a portion of the year. A vigorous opposition has been made to the construction of the combined system of sewers, and a meeting of citizens was held on the evening of April 2, to protest against the consummation of the plans laid out by the city council. At this meeting a lengthy paper was read by Dr. R. Harvey Reed, who undertook to show by the experience of other cities that the separate system would not only be safer but very much cheaper. His views were endorsed by the meeting, and a committee was appointed to confer with the council at its next meeting. The efforts seem to have been in vain, however, and an ordinance was passed two days later authorizing the levying of the tax. It is understood that future meetings were to be held by the citizens, with the hope of having the action of the council rescinded. The plan adopted is to construct a main sewer of brick, four feet in diameter on the main street, into which large tile-drain laterals, two feet in diameter, are to empty, leading in from each street. The main sewer is to discharge its contents half a mile from the city, into a sluggish branch of a creek. The town is supplied with the Holly water works, but whether any provision has been made for flushing the sewers is not stated. It is expected, however, that another creek on the opposite side of the city will be lead into the main sewer. Whether this creek has sufficient water in it at all times to serve any useful purpose in flushing, is doubtful. Among the reasons advanced by Dr. Reed, in the paper which he read at the meeting of the citizens, before referred to, were the following: (1) If sewage were permitted to enter the proposed system of sewers, and an attempt made to flood the main sewer by the small creek, it would be a failure in the summer time, when there is the greatest amount of danger from the poisonous emanations from the sewers, as at that time there would be an insufficient supply of water to cleanse the sewer. (2) The proposed plan would be much more expensive and much less efficient than the small system, and, on account of the size of the sewer, there would be no means of thorough flushing; hence, it would be exceedingly dangerous, from a sanitary standpoint, on account of the accumulations of filth, and the formation and escape of sewer-gas. Dr. Reed believed that if they were to have but one system, the drain should be small and used exclusively for sewage, a good surface drainage being provided for the disposal of storm-water, with a possible under drain in what is known as the "flats."

BAD DRAINAGE AND ERYSIPELAS.

The death of a young lady from erysipelas in Brockton, Mass., believed to have been caused by attending school in a building in poor sanitary condition, has led to an investigation by a committee of the health board, who decided that bad drainage and a lack of care in the construction of the vaults communicating with the building, had caused an accumulation of filth underneath the structure. The board of health recommends that the earth under the building should be removed for a depth of two feet, and replaced with fresh gravel, the old cistern filled up, and a cesspool constructed and communicated with the school by iron pipes, properly trapped, connected with water-closets supplied with city water.

NOTES ON CURRENT PUBLICATIONS.

Health and Home is a new sanitary journal, published as the organ of the Canadian sanitary association, and is sent to all members who pay $2.00 as an annual membership fee. The manager and editor is Fred. N. Boxer, C. E., secretary of the association. Its first issue was for February, and it appears in a cover of rather elaborate design. The aim of the organ is to promote sanitary education in homes and schools. The content of the first number are general in their character, among the titles being found an address to mothers, proceedings of the sanitary institute of Great Britain, accidents, etc. It is to be a monthly journal, and will, by its plan of subscription, bring up the membership of the association to a large number, as each subscriber becomes a member of the association.——A new paper will be published by W. H. Burr & Co., of Detroit, entitled *The American Meteorological Journal*. It will be a monthly, at $3.00 a year. Prof. Mark W. Harrington, director of the observatory of the university of Michigan, will be editor.

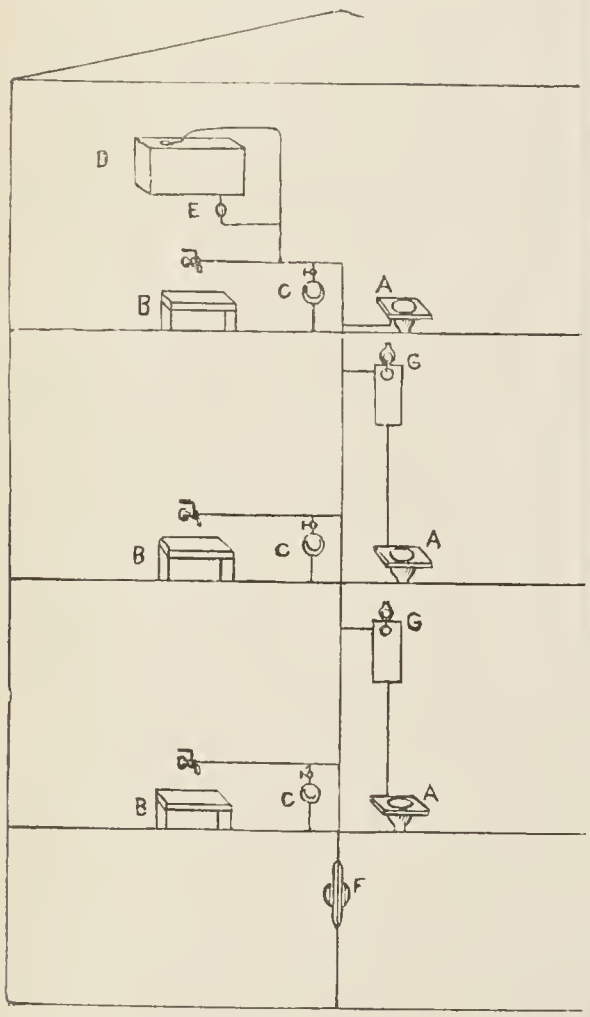
The announcement of the failure of James B. Clow & Son, dealers in plumbers' supplies and sanitary goods, at Nos. 212 and 214 Lake street, this city, was made on April 5. The firm was forced to the wall through its immediate inability to meet a note for $39,774 held by the Reading Iron-Works company, of Pittsburgh, Pa. This action does not seem to have indicated an essential weakness of the house, as business was resumed on the 11th. A meeting of creditors was held, as soon as possible, and the result was a unanimous decision to give further time. The assets were shown to be $188,000, and the liabilities $145,000.

The committee on drainage of the Brockton, Mass., council has made a report and asked for an appropriation of $10,000 to relieve the northerly half of the city. About four thousand feet of pipe will be required.

THE RUBBER-BALL CHECK-VALVE.

Chicago, March 22.—(To the Editor.)—In your issue of March 1, you favor your readers with an illustrated description of an apparatus for securing water on upper floors, the apparatus consisting of a system of pipes and check-valves, which return and distribute the water to as many sinks and other fixtures as may be desired. This device, you state, is shown by Messrs. Thos. Kelly & Bros., of this city. Of course, this language does not indicate that these gentlemen lay any claim to being the original inventors of it; but, if I may be allowed to call your attention to an article printed in your issue of January 1, it will be seen that the device thus shown had already been made known to your readers two months before (though not accompanied with a diagram); not only that, but it was publicly presented at a meeting of the master plumbers' association in this city, even three months before—Nov. 21. The article to which I refer is the paper of mine on "Plumbing of To-day as Compared with that of the Past," read before the association on the date mentioned and published by you Jan. 1.

Nearly a year has passed since the writer of that paper himself conceived and put into operation an automatic apparatus of the kind mentioned, of which the diagram you give in the issue is almost an exact picture, and which may be seen by any person to-day at J. Emmert's sewing-machine factory, No. 47 South Jefferson street, this city. Quoting from my paper already alluded to (page 63, The Sanitary News, Jan. 1), the description of that device is as follows: "We will suppose that there are a water-closet (A), sink (B) and urinal (C) on each floor. During the night the tank (D) fills by ball-cock attached to the same pipe which supplies the



various fixtures on each floor (fixtures A, B and C). In this way the water flows back from the tank (D) into the same supply-pipe. I then tap the bottom of the tank and connect it with the tank supply-pipe, putting in between the tank and the point of connection a check-valve (E). When the pressure of the water from the city main is greater than the pressure from the tank, the check-valve closes and the tank fills by the ball-cock. On the other hand, when the pressure of the tank is greater than the city pressure the water descends and supplies the fixtures. Finally, in order to prevent the water from passing back into the main pipe, or to the lower floor, I put in another check-valve (F), just above the point to which the city pressure rises during the day."

I am willing to concede to Messrs. Kelly the honor of being the first, perhaps, to set this device before the public, accompanied by a mechanical drawing; but that the invention is their own, or that they were the first to make it known to the public, is a matter which, in the face of the facts, they would hardly for a moment assert. As for myself, let it be understood, I do not claim the check, vacuum or air-valve to be anything new or original. Any old-time plumber well remembers the early use of this valve on copper boilers to prevent them from collapsing when the cold water, having been shut off, was suddenly let in after the hot water had been nearly or entirely withdrawn. Neither would I have noticed this matter through your columns at all, had it not been that in a recent issue of a New York paper, I noticed a claim put forth by Messrs. Kelly & Bros. as being the inventors of a rubber-ball check-valve. I have had in use in my own place of business, for nearly six months, a water-closet supplied by a closed tank with a rubber-ball check-valve on the top, as shown on the water-closet tank (G,) and with a copper float-ball inside of the tank to raise the rubber ball before the tank is quiet full. I always hail with pleasure anything that is of real use, old or new, and by whomsoever it may be presented; yet the feeling will arise in one's mind that the person who ploughs the field and sows the seed should be the first to partake of the fruits; and that if he prefers to give the fruit of his labor as a contribution to the public good, it is the privilege of no man to seize upon it and monopolize it. Along with this there is given a drawing of the device mentioned in my previous paper. Yours respectfully,

David Whiteford.

VENTILATION OF CELLARS AND SUB-CELLARS.

Chicago, April 5, 1884.—(To the editor.)—There is a point in the sanitary construction of tenement and residence buildings, which I would like to see thoroughly discussed in The Sanitary News. For the past few years the attention of sanitarians, plumbers and architects has been directed mainly toward a better system of plumbing and drainage, and the results are apparent in the buildings constructed in the city during that time. Devices to prevent the entrance of sewer-gas into these houses have been used with success. But in a large number of these houses there is a space beneath the basement floor and the ground of from one to two and a half feet. The ventilation of this space, I think, could be improved if builders would construct a flue for that purpose, with an opening beneath the floor and extending up over the roof, —this to be in addition to the method of ventilating such space now in use. This would remove emanations from the ground which, in many places, is admitted, and the musty odor of decayed wood, which is often very troublesome in houses built fifteen or twenty years ago. The laws and ordinances of this city relating to the sanitary construction of tenements, has no express provisions for such purposes yet, but the matter deserves attention, and improvement can be made in the matter of such places known as cellars and sub-cellars. Yours very truly,

F. McCormick, M.D.,
Tenement Inspector.

[This is a matter which does, indeed, deserve attention. Occasionally, the floor in basements is laid within a few inches of the ground, and this shallow place becomes a hiding-place for rats and vermin. The precaution is not often taken to have the ground cemented as it should be, so that there is a great deal of danger from the effects of ground-air and escaping sewer-gas from imperfect drains. But it is the more ordinary kind of houses to which the correspondent refers. The main floor of the building is raised above the ground, presumably for the purpose of avoiding dampness, and to secure a circulation under the floor of fresh air; but provision is rarely made for ventilation, as the walls are quite air-tight. The result is that the ground is generally damp and, if not damp, the heat of the houses sucks up the air from a depth of many feet, which is not only unhealthy, but liable to be seriously contaminated in many ways. It is not sufficient to have openings through the side walls to admit fresh air, as the floors are not by any means so close that the air will not be drawn directly into the living-rooms of the house rather than pass out of the openings left on the opposite sides of the walls. A well-known plumber in this city has devised a plan for the combined ventilation of waste-pipes and soil-pipes, and this close damp space under the first floor of the house, and The Sanitary News hopes, at an early day, to present a sketch of it with his explanation. In the meantime, architects, builders and householders should see that this evil in house construction is not continued. It is a question, perhaps, whether there ought ever to be any space allowed between the floor and the cemented ground, which is not accessible; it certainly should be insisted that no house should be built over ground which has not been carefully and thoroughly cemented.—Ed.]

TINSMITHS AND PLUMBING.

Freeport, Ill., March 20, 1884.—(To the editor.)—In your issue of March 15, you explained how to run a hot-water supply. Now there are several jobs of this description here, and I am well aware who the parties are who have done the work. They have the same trouble with other work. Now cannot you, in justice to the plumber, tell them to hire a practical man? I have served an apprenticeship in Chicago, and have come here as a practical plumber, and it is such work as this that will proclaim me one. I cannot get $2.00 or $2.50 a day for plumbing work, because these men say they can do as good work as I can. As they have sent you a diagram of their own work, I will leave you to judge whether plumbers did it or not. Now if you are a friend to the plumbers, and help to protect them, as your journal proclaims you to be, recommend them to a plumber and the work will be done right. Respectfully yours,

Plumber.

[This letter calls attention to a fault which exists in most of our younger cities, especially in the West; it has not been an unknown thing in Chicago, even within a few years. While it is a matter for discussion how hot-water tanks shall be constructed and put up, under certain circumstances, it certainly would be proper to consult a plumber in such work. The tinsmith, blacksmith, or a man of some other trade, cannot successfully undertake to do plumbing even as the plumber should not undertake to do roofing, or shoe a horse. Plumbing, indeed, as a trade, has more of science about it than most trades which have to do with building. It is on this account that the man who has given his attention to the scientific study of the question ought to be consulted. The complaint has been made by some well-meaning plumbers, that such journals as The Sanitary News, which deal with the science and art of plumbing, are liable to injure the cause of the plumber by publishing such instruction as was given in the issue of March 15. This may be an unfortunate circumstance, which cannot temporarily be avoided; but it would be as absurd to say that a sanitary journal should have nothing to say about the correct methods of plumbing as that children should not be taught to write in the public schools, because they might become forgers. There is no danger that the tinsmith will make any serious headway in supplanting the plumber in his work. The correspondent of The Sanitary News, and such as are placed in similar circumstances, may have an up-hill task for a time, but their services cannot be ignored, and they will find work coming to them in due time; the fact that anybody else cannot secure circulation in a hot-water tank will convince the public quicker than anything else of the necessity of the plumber.—Ed.]

SANITARY ASSOCIATION NEWS.

MASTER PLUMBERS' ASSOCIATIONS.

At Chicago, April 2.—The regular meeting of the Chicago master plumbers' association was held on the evening of April 2, in the new rooms of the association, at No 125 Dearborn street. After the transaction of some routine business the committee on portraits of deceased members reported that several additional pictures had been promised. Mr. Murray for the committee also reported that he had received a promise from Mr. Boone to address the association in the near future, when he would give an account of the organization of the first association of plumbers in Chicago.

Mr. Wade reported that the special committee, of which he was chairman, had sent out a circular letter to all the master plumbers of Chicago, calling attention to the desirability of establishing in this city an exchange for the benefit of master plumbers, where plumbers' materials of all kinds could be placed on exhibition, to show the various devices and improvements relative to the profession. The circular then outlined the plan for the purchase of a site for the erection of a building, which was proposed by him at a previous meeting. Attached to this circular was a blank contract for subscription for shares at $10 each. Mr. Wade reported that he had already received subscriptions for a large number of shares and that it was evident the plan would prove a success.

Messrs. O'Donnell and W. H. Tilton, representatives of the journeyman plumbers' protective association, were introduced. Mr. Tilton stated that they had been requested in a letter from Mr. Wade to be present at the meeting. The association which they represented desired that joint committees might be appointed on arbitration to settle any matters of dispute coming up between master and journeymen. Messrs. Wade, Hamblin and Clark were appointed such committee.

Mr. Murray stated that the library committee would like an appropriation of $150 from the library fund, to use in fitting up the library and in the purchase of books. This committee was given full authority to act in the matter of expenditures for the library, on condition that its appropriation should not exceed the amount to the credit of the library fund. Messrs. Moylan and Monahan were added to this committee.

A letter was read from Mr. Abraham Mead, of New York, in reply to the acknowledgment sent him of the receipt of his check of $50, to the credit of the library fund. His letter was full of enthusiasm for the plumber and his work, and he indicated his interest especially in the young men of the trade. He thought that what the Chicago association was about to do would improve the standard of apprenticeship. It would strengthen the moral force and have a tendency to introduce none but the good element into the brotherhood of the craft. The plumber of to-day, he said, must be more than an ordinary mechanic; he must be an engineer, a chemist and a philosopher. He did not mean by this that the plumber must acquire all the learning which these terms would imply in their broadest sense, but that he must be sufficiently posted in the sciences to enable him to grasp all the difficult problems which present themselves in the practice of his profession, and by skill and knowledge solve them. To reach this condition the craft must commence at the foundation and see that the apprentice, who is to be a future master, is fully prepared to enter upon the duties and meet all the requirements that will confront him in the future. Those who are now laying the foundation to go further in this direction were, to his mind, philanthropists, and he thought the Chicago association would receive the thanks of a grateful people.

The election of delegates to the national convention being the special order of the evening, a committee, consisting of Messrs. Watt, John Kelly, Tipple, Hamblin and Griffith, was appointed to make a selection of candidates. After an intermission, in which time was given to prepare this list, the following delegates were elected. Before the election it was decided that each delegate should pay his own expenses to and from Baltimore. The following are the delegates: Messrs. J. Sanders, E. Baggot, P. Harvey, M. Moylan, M. J. Corboy, J. McGinley, V. Ruh, J. S. Bassett, W. Bowden, J. H. Roach, S. J. McGraw, Brown, of Foskett & Brown, and T. Conlin. A number of other members of the association will also attend the convention.

OTTAWA SANITARY CONVENTION.

Ottawa, Ontario, March 11 and 12.—The sanitary convention at the city hall, held under the anspices of the provincial board of health, was opened with prayer, followed by a short address by Dr. John Sweetland, on taking the chair. A communication from the Ontario women's Christian temperance union, asking questions concerning the use of alcoholic beverages in health and disease, was referred to a committee. Dr. Wm. Oldright, of Toronto, chairman of the provincial board of health, gave an introductory address urging the formation of a Dominion board of health, and calling attention to the work of his own board. Dr. C. W. Covernton, of Toronto, called attention to the fact that in the Crimean war, 75 per cent. of the wounded French soldiers died, while but 34 per cent. died in the American war; this difference being due to the better ventilation of the American hospitals, many of them being tents. F. N. Boxer, C. E., of Montreal, stated that 3 per cent. of the deaths in that city were from zymotic disease, and in almost every case he had investigated, the drains were defective. Dr. Wm. Canniff, medical officer of health of Toronto, read a paper on the sanitary education of the masses. Dr. G. Baptie, of Ottawa, read a paper on the ventilation of private dwellings, illustrating his remarks by diagrams. Dr. C. W. Covernton, of Toronto, read a paper on the abuse of alcohol and increase of nervous diseases in modern times, not opposing the moderate use of good wine. Mr. S. Woods, of the Ottawa ladies' college, in a paper on school hygiene, said that as a result of twenty years' experience in teaching, close application never injured the pupil, but troubles arose from bad lighting and poor ventilation of school-rooms. Dr. P. H. Bryce, of Toronto, secretary of the provincial board of health, read a paper on zymotic diseases, where are they and why? It was based on the weekly reports of diseases made to his office from all parts of the province. Dr. Edward Playter, of Ottawa, read a paper on diet in relation to disease T. Guerin, C. E., of the Ottawa public works department, read a paper on sewage, advocating no openings from the sewers into the streets, but good traps on the house drains. Dr. H. F. Roger, of Ottawa, read a paper on "prevention better than cure," urging that contagious diseases be not treated in the home, but removed to an isolated hospital. After resolutions and votes of thanks, the convention adjourned.

BOARDS OF HEALTH.

At Galveston.—Dr. Charles L. Gwynn resigned his position as a member of the city board of health on March 22. His reasons were that the sanitary condition of the city is deplorable, and that the board, under the revised ordinances, is powerless to act. He said that should the quarantine be a failure, the germs of yellow fever will find rich food, and the disease become epidemic and seriously fatal.

CIVIL ENGINEERS.

At Boston, March 19.—The American society of civil engineers met for their annual dinner on March 19, at Boston, Prof. E. W. Bowditch presiding. Covers were laid for sixty-five. Among the guests of the society were Mr. J. J. R. Croes, representing the New York Civil Engineers, Edward Atkinson, Gen. F. A. Walker, and Major C. W. Raymond, U. S. engineer.

THE CONNECTICUT STATE BOARD OF HEALTH'S ANNUAL REPORT.

The sixth annual report of this progressive board, in a handsomely-printed and bound volume of forty-three pages, is well worthy attention. It covers the fiscal year ending Nov. 30, 1883. Its table of contents furnishes a rich field for the sanitary reviewer. The general report of the secretary is an interesting resumé of sanitary progress in general, and of the increased knowledge concerning certain diseases, and shows a thorough acquaintance with details of sanitary work. A description of the Bridgeport hospital, constructed at an expense of $100,000, is given in a paper by Dr. G. F. Lewis. The plan is the same as the model ward of the Johns Hopkins hospital. The hygienic institutes, as conducted in Germany, are discussed in an article by Prof. Geo. A. Smythe. He wisely urges their establishment in this country. Dr. Charles Gardiner, of Hampton, has an interesting account of some unsanitary conditions of country life. The sanitary drainage of tenement houses is written about by Wm. Paul Gerhard, C. E., of New York city, and the article is illustrated with some of the cuts from his last book. Dr. D. F. Lincoln has one of his always valuable articles, this time on the district school-house, the republication of which is begun in this issue of THE SANITARY NEWS. It is freely illustrated, one elevation being by Ernest N. Bayden, of Boston. The secretary's report, and a series of special investigations of great value, close this useful volume. The registration report of 1882 is also appended.

PUBLICATIONS RECEIVED.

FOUNDATIONS AND FOUNDATION WALLS, for all Classes of Buildings, Pile Driving, Building Stones and Brieks, Pier and Wall Construetion, etc., 64 illustrations. By George T. Powell, Arehiteet and Civil Engineer. With a Treatise on Foundations, by Frederick Baumann, Architeet, New York: Wm. T. Comstoek, 6 Astor Plaee. 1884. Pp. 166. Priee, $2.00.

ADMINISTRATION OF THE NATIONAL QUARANTINE SERVICE AND THE EPIDEMIC FUND. Report to the Seeretary of the Treasury. By John B. Hamilton, Surgeon-General. Pam., pp. 61.

OTHER DOCUMENTS: Answer of the Supervising Surgeon-General to the National Board of Health, Mareh 12, 1884, and Arguments and Remarks before the Committee on Publie Health ot the House of Representatives.

SECOND ANNUAL REPORT OF THE HEALTH DEPARTMENT OF KANSAS CITY, for 1883. John Fee, M. D., City-Physician. Pam., pp. 58.

REPORT OF THE COMMISSIONERS OF STATE WATER-SUPPLY OF NEW JERSEY. March, 1884. Pam., pp. 45.

FARMS AND FARM PRODUCTS. Fifth Annual Report of the Seeretary of State of Miehigan. 1882–3, Pam., pp. 190.

GEOLOGICAL SURVEY OF NEW JERSEY. Annual Report of the State Geologist, for the year 1883. Pam., pp. 188.

GIORNALE DELL A REALE SOCIETA ITALIANA D'IGIENE. Anno VI, N. 1. 1884. Pp. 72. Milano: Stabilimento Giuseppe Civelli.

BRIGHTON SEWERAGE. Reported upon by the Speeial Commissioner of *The Plumber and Decorator, and Journal of Gas and Sanitary Engineering*, being an iuvestigatiou into the truth of the alleged libel on Brighton. Priee, sixpenee. London: Dale, Reynolds and Co., 41 Tavistoek Street, Strand, W. C.

EPIDEMIC WAVES OF DIPHTHERIA. By Heury B. Baker, M. D., Lansing, Mieh.

SIGNAL SERVICE NOTES. VI. Report on Wind Veloeities at the Lake Crib and at Chieago. By H. A. Hazeu. VII. Variations of Rainfall West of the Mississippi River. By H. A. Hazen. VIII. The Study of Meteorology in the Higher Sehools of Germany, Switzerland and Austria. By Frank Waldo. IX. Weather Proverbs. By H. H. C. Dunwoody. X. Report on Lady Franklin Bay Expedition of 1883. By Ernest A. Garlington. XI. The Elements of the Heliograph. By Frederiek K. Ward. XII. The Speeial Charaeteristies of Toruadoes, with Praetieal Direetions for the Proteetion of Life and Property. By John P. Finley. All published in Washingtou. by the United States Sigual Serviee of the War Department.

SOCIETE FRANCAISE D'HYGIENE. Auuuaire Nour 1884. Satuto-Bureau-Comites d'Etudes. Liste Geuerale des Members de la Soeiete. Le Siege de la Soeiete este 30, rue du Dragon, 30. Paris.

THE MEDICAL AND SANITARY ADMINISTRATION of Atlantie Steamships and the Position of Ship-Surgeons. Being Reprints from the *British Medical Journal. The Lancet. The Medical Press. The Medical Times and Gazette, The Dally Telegraph, The Liverpool Mercury, The Manchester Courier, The Graphic*, ete. London: The British Medieal Assoeiation, 161 A, Strand, W. C. March 20, 1883.

SIXTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH of the State of Connecticut, for the fiseal year euding Nov. 30, 1883, Pp. 439.

HEALTH AND HOME. A Journal of Sanitary Seieuee and Home Hygiene. Illustrated. The Official Organ of The Canadian Sanitary Assoeiation, and a Dominion Reeord of Vital Statistics. 7 St. James St., Montreal. Vol. 1, No. 1, February, 1884.

NOTES AND NEWS.

CHICAGO BUILDING NOTES.

Major G. A. C. Smith, of Washington, D. C., superintendent of federal government repairs, reports that nothing can be done toward strengthening the government building in this city without an appropriation of several hundred thousand dollars. He adds that unless radical changes and repairs are made the building will fall to pieces. The fault lies in the fact that no piles were driven for the foundation. The sandstone exterior is scaling, and it will cost $30,000 to make good the damage in this direction.

A twelve-story building will be erected at the southwest corner of LaSalle and Quincy streets, for Mr. John B. Mailers; the size will be 38½ x60 feet. A unique design for the structure, in pressed brick, terra cotta and plate glass, has been drawn by the architect, Mr. J. J. Flanders.

Mr. W. L. B. Jenny, of this city, has been selected as architect for the new eight-story office building to be erected at the northeast corner of LaSalle and Adams streets, for the Home Fire Insurance company, of New York.

Six two-story and cellar brick buildings are being erected at the corner of Jackson street and Winchester avenue, for W. H. Davis, to cost $30,000.

New water-closets are being put into the Cook county insane asylum, and it is expected that a saving of 147,000 gallons of water will be effected daily by their use.

PERSONAL.

Dr. W. F. Sheehan, health officer of Rochester, N. Y., read a valuable paper on school hygiene, at the last meeting of the academy of science, that city. Many important suggestions were given as to the heating, ventilation, and lighting of school buildings.

The name of Dr. Thad. M. Stevens is becoming universally associated with sanitary matters in Indiana. His advice and guidance has been asked relative to holding another sanitary convention for that city, under the auspices of the Howard county medical society.

Dr. Edward Kershner, U. S. N., has been appointed professor of naval military and state hygiene.

T. S. Matsdaire, new city engineer of Bradford, Pa., is a native of Japan, and the first man of his nationality to be chosen for a civil office in the United States.

The degree of LL. D. has been conferred upon Doctor John S. Billings, by the university of Edinburgh.

Lieut. Col. Godfrey Weitzel, of the government corps of engineers, died at Philadelphia on March 15.

P. M. Coombs has been elected engineer and superintendent of sewers of Bangor, Me.

Mr. W. A. Collord delivered an address, on March 11, before the engineering section of the Cincinnati mechanics' institute, on artificial and natural filters for the water-supply of cities. He suggested for Cincinnati the use of perforated cast-iron cylinders, sunk in a convenient sand-bar, each connected with the influx mains, and surrounded by concentric rings of broken stone, coarse and fine gravel.

CONSTRUCTION NOTES.

A contract for placing the heating, gas and ventilating pipes in the new capital building at Bismark, Dak., has been awarded to Samuel I. Pope & Co., of Chicago, for $10,000.

The city of Buenos Ayres is building a system of sewers and an outfall canal, and providing for the better distribution of water. There has already been expended $180,779.36. The water-works have been in use fifteen years.

The citizens' steam heating and gas company of Lynn, Mass., are producing gas which is sold at 50 cents per thousand. One hundred purchasers are using the gas for heating purposes.

Howard and Denig, contractors for the new state house at Indianapolis, have made the following building sub-contracts for finishing the building, the contractors continuing to direct the stone work: Peter Routier, Indianapolis, carpenter and joiner work; W. R. Kinnear & Co., Columbus, O., copper, lead, zinc work and slating; H. A. Streeter, Chicago, wrought and cast iron work; Burlington Manufacturing Co., Burlington, Vt., granite, marble, slate, etc; Frank Fertig. Indianapolis, painting and glazing; the Encaustic Tile Co., of Indianapolis, tiling.

An order has been passed directing the commissioner of public works to let the contracts for the completion of the Chicago city hall, without further advertising. The contract for the carpenter work on the rooms of the board of education has been let to A. E. Fortin, for $13,200. He agrees to have the work completed by May 15.

Two new engine houses will be constructed in Hyde Park, Ill., at $6,000 each.

A contract for two new buildings to replace one burned at the Indiana university, at Bloomington, was awarded to H. J. Nichols & Sons, for $59,982.00. The buildings will be two stories high, brick, with stone finish, and are to be completed by next December.

The plans for a new court-house at Madison, Wis., prepared by H. C. Koch & Co., of Milwaukee, call for a fire-proof structure, to cost $150,000. The building commission has referred the matter of heating to Mr. A. D. Conover, who is making a specialty of this branch of engineering. This is commendatory, as means of heating in our large buildings are seldom adapted to the circumstances; the result is that a great amount of heat is wasted, or there is a lack of sufficient heat. This court-house will be 115x86 feet in size, three stories and basement high.

SANITARY AND BUILDING PATENTS.

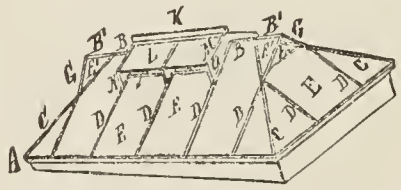
295,067. DOVETAILED GROOVED BRICK FOR BUILDING PURPOSES. George S. Stearns, New York, N. Y. Filed Jan. 22, 1884.

295,142. SASH FASTENER. Henry H. Asimont, Duluth, Minn., assignor to Alfred H Hartson, same place. Filed Nov. 28, 1883.

295,163. WINDOW SCREEN. John A. Grove, Bluffton, Ind. Filed June 21, 1883.

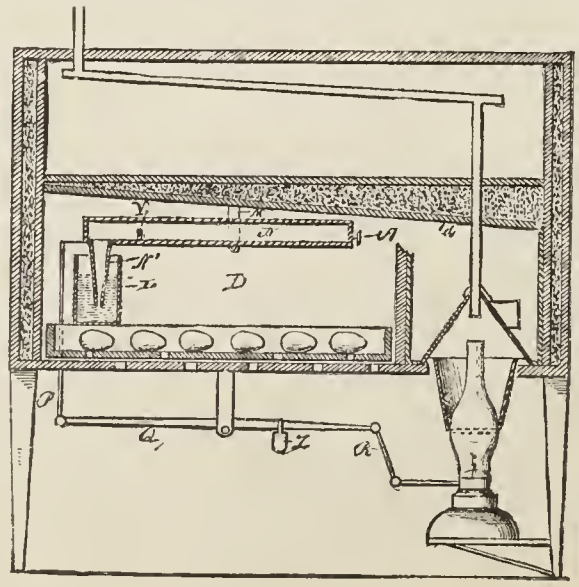
295,164. HOSE ATTACHMENT FOR STREET-WASHERS. Chas. Gumlich, Jr., Cleveland, O. Filed May 17, 1883.

295,168. VENTILATING SKYLIGHT. George Hayes, New York, N. Y. Filed July 17, 1883.



Ventilator-apertures are provided in the skylight-glass, located adjacent to the ridge and covered with a hood formed with vertical and inclined top-bars, the top and side being glazed. The ridge bar is extended horizontally, and has gable-bars sloping to the hipped bars o the skylight, the parts being glazed and forming a ventilator-opening. The upper edge of the glass, which is cut away, has a supporting rabbeted cross-bar and gutter The ridge bar has a vertical extension with rabbets supporting glass plates. The ventilator-openings have lower slats.

295,381. DEVICES FOR REGULATING TEMPERATURE.



James M. Halsted, Oakland, Cal., assignor to Kate K. Halsted, same place. Filed Aug. 29, 1883.

This is a combination, in an incubator of similar structure, of a casing adapted by the expansion of air it contains to shift or move devices controlling the heat source and an air-induction valve admitting air to the casing to effect its return to its first position.

295,204. PIPE-WRENCH. Frank A. Schramm and Ambrosius Modesy, Philadelphia, Pa. Filed Dec. 7, 1883.

295,205. PIPE-MOLDING APPARATUS. Frederick Shickle, St. Louis, Mo. Filed June 25, 1883.

295,283. METALLIC ROOFING SHINGLE. Ephraim B. Repp, New Windsor, Me., assignor to the Anglo-American Roofing Co., New York, N. Y. Filed Oct. 8, 18 1. Renewed July 26, 1882. Again renewed Feb. 28, 1883. Again renewed Feb. 20, 1884.

295,343. STEAM-RADIATOR. Robert Brass and John Chapman, Brooklyn, N. Y. Filed June 9, 1883.

295,479. LAMP. Charles B. Boyle, New York, N. Y., assignor to the Boyle illuminating company, same place. Filed Aug. 25, 1882. Renewed Aug 23, 1883.

295,499. VENTILATING APPARATUS. William Lord, Middlesbrough, county of York, Eng. Filed July 16, 1883

295,502. GAS FURNACES. John T. Morgan, Selma, Ala., and Henry F. Hayden, Washington, D. C. Filed June 4, 1883.

295 519. EXPANSION SLIDE CHANDELIER. John P. Bonner, Brooklyn, N. Y., assignor to W. C. Vosburgh manufacturing company (limited), same place. Filed July 28, 1883.

295,525. COMPOSITION FOR WATERPROOFING AND PRESERVING BUILDINGS. Benjamin Denise, Camden, N. J., assignor of one-fourth to Joseph Chapman, of Philadelphia, Pa. Filed Feb. 21, 1884.

This compound consists of fossil wax, carnauba wax, refined paraffine oil and carbolic acid, united by heat.

295,532. GAS PRESSURE REGULATOR. Lewis G. Francis, La Grange, and John A. Tibbs, Hinsdale, Ill. Filed Dec. 13, 1883.

295,537. WEATHER STRIP. Eugene Gillett, Western Union, Wis. Filed Aug. 27, 1883.

295,600. HYDRANT. Benjamin C. Vanduzen, Cincinnati, O. Filed July 18, 1882.

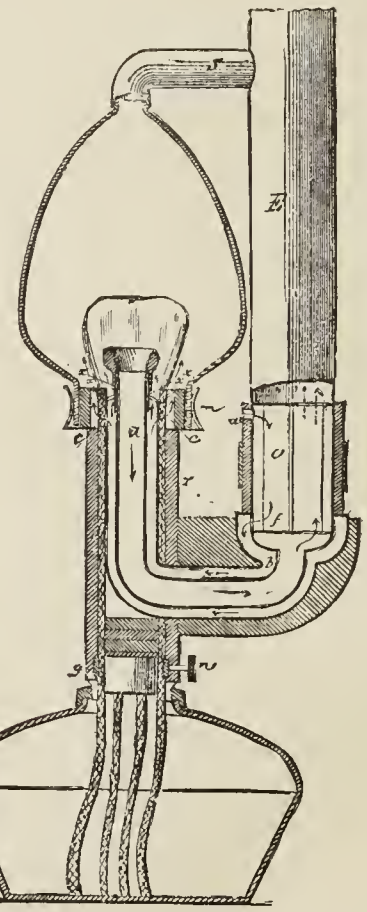
295,604. ROOFING COMPOSITION. Welcome White, Everett, Mass., assignor of one-half to William L. Maltby, Montreal, Canada. Filed Jan. 29, 1883.

295,610. WOOD PAVEMENT. Robert Albrecht, Tilsit, Prussia. Filed Feb. 1, 1884.

The pavement is composed of a foundation of unburnt bricks and wooden blocks laid upon a foundation and connected by interlinking metal strips, inserted inside crevices of the blocks.

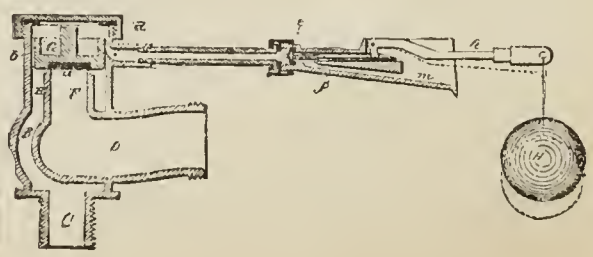
295,622. VALVE GEAR FOR HYDRAULIC PUMPS. George W. Dickie, San Francisco, Cal. Filed March 21, 1882.

295,666. HOT AIR OIL LAMP Charles H. Murray, Leadville, Colo. Filed Nov. 24, 1882.



295,687. CHIMNEY COWL. Emil R. Stasch, Corning, N. Y. Filed Sept 3, 1883.

295,691. WATER-CLOSET VALVE. Henry A. Tobey, Dayton, O., assignor to the Hartford sanitary plumbing company, Hartford, Conn. Filed July 30, 1883.



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